JUN 1979

bart impact program

Land Use and Urban Development Project

PROGRAM-WIDE CASE STUDIES

COMPLETED
ORIGINAL

156

planning document

The BART Impact Program is a comprehensive, policy-oriented study and evaluation of the impacts of the San Francisco Bay Area's new rapid transit system (BART).

The program is being conducted by the Metropolitan Transportation Commission, a nine-county regional agency established by state law in 1970.

The program is financed by the U. S. Department of Transportation, the U. S. Department of Housing and Urban Development, and the California Department of Transportation. Management of the Federally funded portion of the program is vested in the U. S. Department of Transportation.

The BART Impact Program covers the entire range of potential rapid transit impacts, including impacts on traffic flow, travel behavior, land use and urban development, the environment, the regional economy, social institutions and life styles, and public policy. The incidence of these impacts on population groups, local areas, and economic sectors will be measured and analyzed. Finally, the findings will be interpreted with regard to their implications for the planning of transportation and urban development in the Bay Area and other metropolitan areas.

DOCUMENT NO. DOT-BIP-WP-53-5-78 DOT-OS-30176

BART IMPACT PROGRAM

LAND USE AND URBAN DEVELOPMENT PROJECT

PROGRAM-WIDE CASE STUDIES

July 1978

Document is available to the public through the
NATIONAL TECHNICAL INFORMATION SERVICE
SPRINGFIELD, VIRGINIA 22161

WORKING PAPER

PREPARED FOR

U.S. DEPARTMENT OF TRANSPORTATION

AND

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

NOTICE

This document is disseminated under the sponsorship of the U.S. Department of Transportation and Department of Housing and Urban Development in the interest of information exchange. The United States Government and the Metropolitan Transportation Commission assume no liability for the contents or use of this document.

PREPARED BY JOHN BLAYNEY ASSOCIATES/DAVID M. DORNBUSCH & CO., INC.
A JOINT VENTURE

UNDER CONTRACT WITH THE METROPOLITAN TRANSPORTATION COMMISSION

FOR THE U.S. DEPARTMENT OF TRANSPORTATION

AND THE U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

UNDER CONTRACT DOT-OS-30176, TASK ORDER 205

JULY 1978

Technical Report Documentation Page

1. Report No.	2. Government Access on No.	3. Recipient's Catalog No.
DOT-BIP-WP-53-5-78		

4. Title and Subtitle	5. Report Date
Program-Wide Case Studies	July 1978
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Michael H. Fajans, Michael V. Dyett	WP-53-5-78
9. Performing Organization Name and Address John Blayney Associates/David M. Dornbusch & Co., Inc. A Joint Venture 177 Post Street, Suite 750 San Francisco, California 94108	10. Work Unit No. (TRAIS) Task Order 205
	11. Contract or Grant No. DOT-OS-30176
12. Sponsoring Agency Name and Address U.S. Department of Transportation and U.S. Department of Housing and Urban Development Washington, D.C.	13. Type of Report and Period Covered Working Paper
	14. Sponsoring Agency Code

15. Supplementary Notes

The Metropolitan Transportation Commission is the prime contractor for the BART Impact Program. John Blayney Associates/David M. Dornbusch & Co., Inc., A Joint Venture, is the subcontractor responsible for the Land Use and Urban Development Project.

16. Abstract

This working paper consists of in-depth, policy-oriented case studies of BART's impacts on selected communities, synthesizing all case study work in the BART Impact Program. The variety of BART impacts are described for downtown San Francisco and downtown Oakland, representing urban core areas; the Mission District of San Francisco, the Rockridge neighborhood of north Oakland, and Richmond, representing urban residential areas; and Walnut Creek and Fremont, selected as typical suburban residential communities.

BART impacts on the natural environment, public policy, institutions and lifestyles, transportation service and travel behavior, as well as land use and urban development are evaluated in terms of pre-BART and no-BART alternatives. Comparative statistics on population, employment, housing, land use and travel behavior are presented, and pre- and post-BART land use and zoning are mapped for each study area. Each case study concludes with an analysis of similarities and differences, and an assessment of the policy implications of the BART experience to date.

17. Key Words	18. Distribution Statement
San Francisco Bay Area Rapid Transit System (BART); BART Impact Program; rail rapid transit; public transportation land use impacts, urban transportation planning; transportation program evaluation	Document is available to the public through the National Technical Information Service, Springfield, Virginia 22151

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	129	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

Technical Report Documentation Page

1. Report No.	2. Government Access on No.	3. Recipient's Catalog No.
DOT-BIP-WP-53-5-78		

4. Title and Subtitle	5. Report Date
Program-Wide Case Studies	July 1978
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Michael H. Fajans, Michael V. Dyett	WP-53-5-78
9. Performing Organization Name and Address John Blayney Associates/David M. Dornbusch & Co., Inc. A Joint Venture 177 Post Street, Suite 750 San Francisco, California 94108	10. Work Unit No. (TRAIS) Task Order 205 11. Contract or Grant No. DOT-OS-30176
12. Sponsoring Agency Name and Address U.S. Department of Transportation and U.S. Department of Housing and Urban Development Washington, D.C.	13. Type of Report and Period Covered Working Paper 14. Sponsoring Agency Code

15. Supplementary Notes

The Metropolitan Transportation Commission is the prime contractor for the BART Impact Program. John Blayney Associates/David M. Dornbusch & Co., Inc., A Joint Venture, is the subcontractor responsible for the Land Use and Urban Development Project.

16. Abstract

This working paper consists of in-depth, policy-oriented case studies of BART's impacts on selected communities, synthesizing all case study work in the BART Impact Program. The variety of BART impacts are described for downtown San Francisco and downtown Oakland, representing urban core areas; the Mission District of San Francisco, the Rockridge neighborhood of north Oakland, and Richmond, representing urban residential areas; and Walnut Creek and Fremont, selected as typical suburban residential communities.

BART impacts on the natural environment, public policy, institutions and lifestyles, transportation service and travel behavior, as well as land use and urban development are evaluated in terms of pre-BART and no-BART alternatives. Comparative statistics on population, employment, housing, land use and travel behavior are presented, and pre- and post-BART land use and zoning are mapped for each study area. Each case study concludes with an analysis of similarities and differences, and an assessment of the policy implications of the BART experience to date.

17. Key Words	18. Distribution Statement
San Francisco Bay Area Rapid Transit System (BART); BART Impact Program; rail rapid transit; public transportation land use impacts, urban transportation planning; transportation program evaluation	Document is available to the public through the National Technical Information Service, Springfield, Virginia 22151

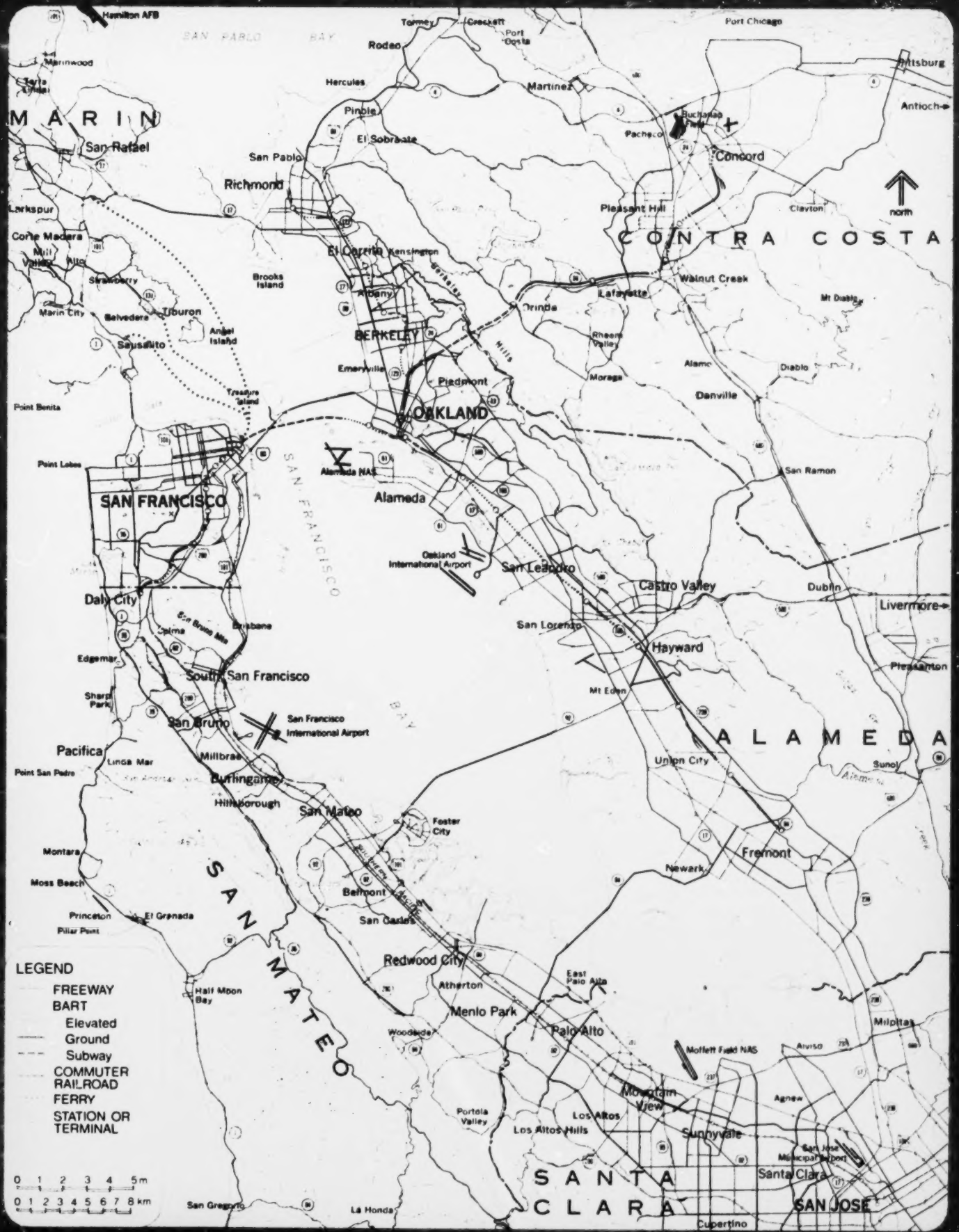
19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	129	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

d

ACKNOWLEDGEMENTS

This working paper incorporates the findings of other projects in the BART Impact Program, and the authors gratefully acknowledge the contributions of the individual contractors — Booz, Allen & Hamilton, Inc., DeLeuw, Cather & Co., Gruen Associates, Inc., Jefferson Associates, Inc., McDonald & Grefe, Inc., and Peat, Marwick, Mitchell & Co. — and the comments of the Metropolitan Transportation Commission staff and outside reviewers. However, responsibility for report writing, editing, and interpretation rests with John Blayney Associates/David M. Dornbusch & Co., Inc., A Joint Venture.



SAN FRANCISCO BAY REGION

CENTRAL AREA

Metropolitan Transportation Commission

BART: The Bay Area Rapid Transit System

Length: The 71-mile system includes 20 miles of subway, 24 miles on elevated structures and 27 miles at ground level. The subway sections are in San Francisco, Berkeley, downtown Oakland, the Berkeley Hills Tunnel and the Transbay Tube.

Stations: The 34 stations include 13 elevated, 14 subway and 7 at ground level. They are spaced at an average distance of 2.1 miles: stations in the downtowns are less than one-half mile apart, while those in suburban areas are two to four miles apart. Parking lots at 23 stations have a total of 20,200 spaces. There is a fee (25 cents) at only one of the parking lots. BART and local agencies provide bus service to all stations.

Trains: Trains are from 3 to 10 cars long. Each car is 70 feet long and has 72 seats. Top speed in normal operations is 70 mph with an average speed of 36 mph including station stops. All trains stop at all stations on the route.

Automation: Trains are automatically controlled by the central computer at BART headquarters. A train operator on board each train can override automatic controls in an emergency.

Magnetically encoded tickets with values up to $20 are issued by vending machines. Automated fare gates at each station compute the appropriate fare and deduct it from the ticket value. At least one agent is present at each station to assist patrons.

Fares: Fares range from 25 cents to $1.45, depending upon trip length. Discount fares are available to the physically handicapped, children 12 and under, and persons 65 and over.

Service: BART serves the counties of Alameda, Contra Costa and San Francisco, which have a combined population of 2.4 million. The system was opened in five stages, from September 1972 to September 1974. The last section to open was the Transbay Tube linking Oakland and the East Bay with San Francisco and the West Bay.

Routes are identified by the terminal stations: Daly City in the West Bay, Richmond, Concord and Fremont in the East Bay. Trains operate from 6:00 a.m. to midnight on weekdays, every 12 minutes during the daytime on three routes: Concord-Daly City, Fremont-Daly City, Richmond-Fremont. This results in 6-minute train frequencies in San Francisco, downtown Oakland and the Fremont line where routes converge. In the evening, trains are dispatched every 20 minutes on only the Richmond-Fremont and Concord-Daly City routes. Service is provided on Saturdays from 9 a.m. to midnight at 15-minutes intervals. Future service will include a Richmond-Daly City route and Sunday service. Trains will operate every six minutes on all routes during the peak periods of travel.

Patronage: Approximately 142,000 one-way trips are made each day. Approximately 200,000 daily one-way trips are anticipated under full service conditions.

Cost: BART construction and equipment cost $1.6 billion, financed primarily from local funds: $942 million from bonds being repaid by the property and sales taxes in three counties, $176 million from toll revenues of transbay bridges, $315 million from federal grants and $186 million from interest earnings and other sources.

March 1978

G.

PREFACE

The BART Impact Program (BIP) is a comprehensive policy-oriented effort to identify, describe, measure, and present findings as accurately as possible about the multi-faceted impacts of a major public transportation investment — the BART system. The major objective of the Land Use and Urban Development Project is to determine how and to what extent BART has influenced the spatial arrangements of people and activities within the San Francisco Bay Area. To accomplish this task, the project will focus on the way BART has influenced (1) location decision processes; (2) actual movement behavior that results from those decisions and other market forces; and (3) the form, character, and functioning of aggregate spatial groupings that represent the net outcome of those decisions and movement patterns. Changes attributable to BART will be measured against pre-BART and no-BART alternatives. In all of these studies, BART's effects on individual socio-economic groups, particularly minorities and the disadvantaged, will receive careful attention.

The Land Use and Urban Development Project is one of six major projects comprising the BART Impact Program. The others are:

- Economics and Finance Project (E&F)
- Environmental Project (Env)
- Institutions and Lifestyles Project (ILS)
- Public Policy Project (PP)
- Transportation System and Travel Behavior Project (TSTB)

Each of these projects is designed to investigate specific aspects of BART's impacts, to explain why the impacts occur, and to identify who is affected by the impacts and the distributional effects. The projects then will demonstrate how the information derived can be used by decision-makers to enhance the benefits and to reduce the dis-benefits of BART, and to increase understanding of the potential impacts of rail transit investments in the Bay Area and other American metropolitan areas.

This working paper presents the analysis and findings of the program-wide case studies of BART's impacts. The paper is presented for review by BART Impact Program staff, federal sponsors, and other interested planners and researchers.

TABLE OF CONTENTS

		Page
SUMMARY		i
	Objectives	i
	Methodology	j
	Findings	iii
	Conclusions	viii
	Policy Implications	ix
1.	INTRODUCTION	1
	Organization of Report	2
2.	FRAMEWORK FOR ANALYSIS	3
	Objectives	3
	The Impact Process: Theoretical Perspective	4
	Case Study Areas	6
	Data Collection, Analysis, and Interpretation	9
	Limitations	15
3.	URBAN CORE STUDY AREAS	16
	Overview	16
	Downtown San Francisco	18
	Downtown Oakland	29
	Similarities and Differences	38
	Policy Implications	42
4.	URBAN RESIDENTIAL STUDY AREAS	43
	Overview	43
	Mission District	46
	Richmond	52
	Rockridge	60
	Similarities and Differences	65
	Policy Implications	70
5.	SUBURBAN STUDY AREAS	71
	Overview	71
	Walnut Creek	71
	Fremont	82
	Similarities and Differences	89
	Policy Implications	93
BIBLIOGRAPHY		95
PARTICIPATING FIRMS		102
APPENDIX A. KEY INFORMANTS INTERVIEWED		A-1

TABLES

Table 1. Allowable Densities in Residential Zoning Districts (Minimum Site Area in Square Feet Required per Dwelling Unit) 12

Table 2. Urban Core Case Study Areas: Summary Statistics 19

Table 3. Major Milestones in the San Francisco Urban Core Case Study Area, 1962-78 20

Table 4. Major Milestones in the Oakland Urban Core Case Study Area, 1962-78 30

Table 5. Urban Core Case Study Areas: Summary of 1965-77 Station Area Land Use Changes 39

Table 6. Characteristics of BART Users Working in Urban Core Case Study Areas 40

Table 7. Urban Residential Case Study Areas: Summary Statistics 45

Table 8. Major Milestones in the Mission District Case Study Areas 47

Table 9. Major Milestones in the Richmond Case Study Area, 1962-78 53

Table 10. Major Milestones in the Rockridge Case Study Area, 1962-78 61

Table 11. Characteristics of BART Users -- Trips Originating in the Urban Residential Case Study Area 67

Table 12. Urban Residential Case Study Areas: Summary of 1965-77 Station Area Land Use Changes 68

Table 13. Suburban Case Study Areas: Summary Statistics 72

Table 14. Major Milestones in the Walnut Creek Case Study Area: 1962-78 74

Table 15. Major Milestones in the Fremont Case Study Area: 1962-78 83

Table 16. Suburban Case Study Areas: Summary of 1965-77 Station Land Use Changes 90

Table 17. Characteristics of BART Users: Trips Originating in the Suburban Case Study Area 91

FIGURES

Figure 1. The Impact Process 5

Figure 2. Case Study Areas: 8

Figure 3. San Francisco and Oakland Urban Core Study Areas: BART Patronage Trends, 1973-78 17

Figure 4. Mission, Richmond, and Rockridge Case Study Areas: BART Patronage Trends, 1973-78 44

Figure 5. Walnut Creek and Fremont Case Study Areas: BART Patronage Trends, 1973-78 73

MAPS

(following page)

Downtown San Francisco Civic Center-Powell-Montgomery-Embarcadero Station Areas: 1965 Pre-BART Land Use and Zoning 22

Downtown San Francisco Civic Center-Powell-Montgomery-Embarcadero Station Areas: 1965-77 Land Use Changes and Zoning 22

Downtown Oakland 12th Street-19th Street-Lake Merritt Station Areas: 1965 Pre-BART Land Use and Zoning 32

Downtown Oakland 12th Street-19th Street-Lake Merritt Station Areas: 1965-77 Land Use Changes and Zoning 32

Mission District 16th Street-24th Street Station Areas: 1965 Pre-BART Land Use and Zoning 48

Mission District: 16th Street-24th Street Station Areas: 1965-77 Land Use Changes and Zoning 48

Richmond Station Area: 1965 Pre-BART Land Use and Zoning 56

Richmond Station Area: 1965-77 Land Use Changes and Zoning 56

Rockridge Station Area: 1965 Pre-BART Land Use and Zoning 62

Rockridge Station Area: 1965-77 Land Use Changes and Zoning 62

Walnut Creek Station Area: 1961 General Plan 1965 Pre-BART Land Use and Zoning 74

Walnut Creek Station Area: 1965-77 Land Use Changes and Zoning and 1977 General Plan 74

MAPS (continued)

	(following page)
Fremont Station Area: 1965 Pre-BART Land Use and Zoning and 1965 General Plan	84
Fremont Station Area: 1965-77 Land Use Changes and Zoning	84

SUMMARY

OBJECTIVES

The principal objective of this study is the synthesis and correlation of all case study work for the BART Impact Program (BIP). These case studies draw together information on all types of BART impacts, not just those that are the focus of the Land Use and Urban Development Project, and thus represent the culmination of a program-wide effort involving all BIP projects. The case studies are designed to provide an easily readable account of the magnitude and meaning of BART's impact, focusing on answers to the "what," "why," and "who" questions to give planners and decision makers a real sense of how BART -- the first rail rapid transit to be built in the United Stated in 50 years -- has impacted a particular community.

- What are BART's impacts on travel conditions, economic activity, land use, public policies and other aspects of life in the case study communities?

- Why do these impacts occur? Why did only some expected impacts occur? Why did others occur in unanticipated magnitudes, ways, or places?

- Who is affected by the impacts? Are impacts on minorities and the disadvantaged any different from those on other socio-economic groups?

Some of these questions also are addressed by the Public Policy Project report on Local Policy Implications of BART Development.[1] The focus of the Program-Wide Case Studies is not to duplicate that work, but to concentrate on examining local land use and development policies and rezoning actions to the extent that they can explain why certain impacts occurred and how BART's benefits might be maximized by Bay Area decision makers. The transferability of these findings to other jurisdictions contemplating similar rail transit investments also was addressed.

METHODOLOGY

Three types of case study areas were selected by the BART Impact Program staff and contractors, based on population and urban development characteristics, local public policy toward BART, the availability of critical data, and the nature and extent of BART's impacts. Downtown San Francisco and downtown Oakland were selected to represent urban core areas. The Rockridge neighborhood of north Oakland, the Mission District of San Francisco, and the area tributary to the Richmond BART station were chosen as typical urban residential areas

1. Booz, Allen & Hamilton, Inc., Local Policy Implications of BART Development (Berkeley: BART Impact Program Public Policy Project Working Paper, February 1978 (Draft)).

with different concentrations of minority groups. Finally, the areas served by the Walnut Creek and Fremont BART stations were selected as representative suburban communities.

Relevant social, economic, fiscal, environmental, and land use information was assembled as the basis for a profile of each area. Data and analyses from other work elements of the Land Use and Urban Development Project, as well as all case study data from other BART Impact Projects, were combined and organized by subject and geographic area to present as complete a picture as possible of BART's effects on these communities.

The Impact Process

To place the findings in perspective, some clarifying concepts about the impact process are in order. The theory is simple. By its construction and operation BART has affected the transportation system and the environment within which it operates. If BART provides faster, more convenient, or less costly service than existed prior to its construction, then it will affect people's decisions on where to live and work. If BART also provides better (or different) transportation service than would have existed in its place, patterns of urbanization are likely to be different than they would have been without BART. In analyzing BART's effects, the BART Impact Program identified five attributes, each with its own set of impacts: organization, planning and publicity; the construction process; transportation service; facilities and operations; and capital and operating expenditures. The fifth was not examined in a case study context because it mainly affects the regional economy, and differences between case study communities are not apparent.

The impact process began with the early planning studies in the 1950s; the first major milestone was in 1962 when the $792 million bond issue was approved by voters in the three county BART District. Then, final decisions were made on station and route locations, and the physical and operating characteristics of the system were established. With construction and the opening of service, further changes in the environment and transportation service occurred; the final links in the impact process included perceptions of BART and its impacts — both actual and expected -- and actions taken in response to them. Participants in the impact process include the travelling public, local officials, downtown businessmen, residents (including those displaced by the system), and property owners and tenants living and working around the stations.

The No-BART Alternative (NBA) — BART's effects were identified by analysis of pre-BART and no-BART alternatives. BART's impact is the difference between what happened after the decision to build BART was made in 1962 and what might have happened — the no-BART alternative — had an alternative transportation system evolved. The BART Impact Program has defined this NBA to isolate net effects of BART from those changes that would have occurred anyway because of other factors. Essentially, the NBA is the 1971 transportation network with minor improvements in bus service. It does not offer the same level of service or mobility as BART does.

FINDINGS

Overview

In each of the case study areas BART has had an effect, but the differences between cases are perhaps more pronounced than the similarities due to the economic and political environment in each community. Before addressing these, some commonalities are worth noting. First, BART's benefits have been less than expected partly because it does not provide the level of service expected: reliability has been poor, average train speeds are 80 percent of those originally planned (36 versus 45 miles per hour), and peak hour train frequencies are six minutes, not 90 seconds. BART also did not cause downtown revitalization or clustered, high density housing around suburban stations. To its credit, BART's adverse environmental effects are minimal. It meets its original mandate to carry long distance commuters to central city workplaces. Shoppers also use BART, a benefit for downtown merchants who might otherwise have lost these customers to outlying shopping centers and other retail areas, and a loss to merchants in these outlying areas except for department stores with outlets in both downtowns and the suburbs. Through planning and zoning actions, redevelopment projects, and capital improvement programs, some local communities have endeavored to capitalize on opportunities for coordinating development with construction and operation of BART. In some cases, the successes demonstrate the value of coordinated planning efforts to implement land use and transportation policies. In others, it is still too early to see BART's role clearly.

Because BART represented a major, long-term commitment of public resources, its effects are greater than would have occurred under the NBA. To name only three differences, transit ridership is higher, workplace and residence location decisions would have been less influenced by the NBA, and decisions on the timing and location of several major office developments would not have been affected by the NBA because of the leverage BART provided local agencies, allowing them to undertake larger redevelopment projects and initiate capital improvement programs. But the case studies also illustrate that while BART cannot create markets where they do not exist; it can serve and enhance markets, and act as a catalyst for public and private decision making. On balance, the BART experience demonstrates that the urban form-giving potential of a rail rapid transit system exists, but is limited. The story of BART in each community should be read with this perspective on the overall level of impact in mind. The individual case study findings are presented in the following sections, treating separately urban core areas, urban residential areas, and suburban areas.

Urban Core Areas

The original impetus for BART came in the early 1940s from national military concerns with the effects of congestion on production of war materials in Bay Area factories. In the late 1940s and 1950s concern about the effects of increasing highway congestion and suburbanization on the vitality of San Francisco as a business and retail center became more widespread. For example, one

of the specific expected benefits of BART cited in the 1962 Composite Report was that the system would lead to the "preservation and enhancement of urban centers and subcenters".[2] Oakland and Berkeley were expected to share in these benefits.

Both San Francisco and Oakland have had a rapidly declining proportion of regional retail sales, and in fact retail sales (unadjusted for inflation) in downtown Oakland have been virtually static for close to 20 years. Both cities also have lost manufacturing and other industrial employment, while becoming more specialized financial and service centers. While the Port and industrial employment remain stronger in Oakland, it is downtown San Francisco, with four times the employment level of downtown Oakland, which remains the dominant commercial center for the Bay Area, while Oakland serves as a secondary regional center. Although office rents average $.20 a square foot per month higher in San Francisco, office demand remains stronger in San Francisco despite Oakland's more central location on the BART system. Downtown daily BART patronage of 49,100 trips in San Francisco and 13,800 trips in Oakland in March 1978 illustrates the relative uses of BART in each city. In fact, patronage has been increasing at the downtown San Francisco stations at an average annual rate of 9 percent, while ridership at the downtown Oakland stations has remained relatively constant since transbay service began in 1974.

Station locations in downtown San Francisco and Oakland were sited to serve the office, retail, and governmental centers of the two cities. Both cities modified their planning and zoning policies to encourage development in the BART corridor, Oakland abolishing the parking requirements for commercial development near stations, and San Francisco more significantly changing the boundaries of its high intensity commercial district to center on Market Street. San Francisco also created floor area ratio bonuses for direct access or proximity to stations.

Both cities carried out supplementary public improvement programs to capitalize on the opportunities for downtown development. San Francisco made a major commitment to improve local transit in the Market Street corridor, and implemented the Market Street Development Plan, a major beautification program to improve the decaying Market Street area. Concurrently, the Golden Gateway redevelopment project was underway and the Yerba Buena redevelopment project initiated to revitalize areas adjacent to Market Street.

Oakland approved a more modest beautification plan for Broadway, and used the expectation of BART's benefits (and BART station construction costs as part of the in-lieu local share) for expansion of three downtown urban renewal projects, the most notable of which is the Oakland City Center Project, a partially completed development ultimately to include four major office buildings, an in-town regional shopping center, and a major hotel. Thus, BART was a key element in a major public commitment to the downtown areas, designed and built to encourage complementary private investment. In fact, in both San Francisco and Oakland, business and civic leaders were most prominent in planning and implementing new policies and projects.

---

2. Parson, Brinckerhoff, Tudor, Bechtel, Composite Report - Bay Area Rapid Transit, San Francisco, California, May 1962, p. 82.

BART was built in a subway through both of the downtowns, minimizing the possibility of long-term, adverse environmental impacts. Subway construction did take four to five years, and merchants perceived a BART-related loss of sales during this period. There was little dislocation of households or businesses in San Francisco, but approximately 400 households in addition to some businesses were relocated in Oakland because of BART.

BART has served to reinforce the downtowns as viable business centers. San Francisco has witnessed a tremendous expansion of office space in the downtown; over 23 million square feet of new office space has been added within 1,500 feet of the BART stations since 1965. While BART was not considered a major location criterion for decisions on whether to build or locate in downtown San Francisco, it served to accelerate the trend in new office construction toward and across Market Street from the traditional financial center several blocks to the north. In Oakland, where the market for new office space remains considerably weaker, BART service was an important factor in most decisions to build or occupy new office space (approximately 1.5 million square feet of office space have been built in downtown Oakland in the vicinity of BART since 1965). BART's positive influence is reflected in commercial office rents in the proximity of stations.

BART patrons (shoppers and workers) have gained from the service provided, particularly those commuting to downtown San Francisco from the suburban communities along the Concord and Fremont lines.

To sum up, the downtown core communities have received numerous, sometimes substantial benefits from BART. The communities effectively drew public and private investments into the BART corridors, and community residents may have gained from the increased employment opportunities as a result of the continued centralization of employment (although BART does not serve most Oakland and San Francisco neighborhoods well in relation to existing bus transit options). Retail merchants apparently were negatively affected by BART construction impacts, but may gain in the long-term from an apparently increasing propensity to use BART to shop in the downtown areas.

Urban Residential Areas

All three urban residential communities studied include older residential neighborhoods but have varying ethnic composition and densities. San Francisco's Mission District has a substantial Latino population, the vicinity of the Richmond station contains a large black population, and the immediate Rockridge station area has mostly white residents, but a substantial black population is found to the west. The Mission District is largely medium to higher density, multi-family rental housing, while Richmond and Rockridge have a mix of single family homes and small apartments. All three areas have neighborhood and community level commercial facilities. The College Avenue commercial strip through Rockridge has recently become a vital area, serving local needs, and also containing boutiques, restaurants, and antique shops. The Richmond downtown commercial district adjoining the BART station is quite depressed, with no

better prospects for the next five years, while Mission District commercial facilities declined in the 1960s and early 1970s. In recent years, Mission District retail business has improved near the 24th Street station but remains depressed in the vicinity of the 16th Street station.

Community involvement was not substantial in either the Mission District or Rockridge station location decisions, while the initial Richmond station location was moved from one side of the downtown to the other to complement plans for renewal of downtown Richmond. Community concerns with potential BART-related impacts (redevelopment in the Mission and higher density housing in Rockridge) encouraged community organization efforts that led to downzoning in both communities by 1974. These rezonings have precluded BART-related development in Rockridge, and reduced opportunities for development in the Mission District.

Minor street beautification was carried out on Mission Street in conjunction with station construction, and small plazas were developed at the stations. Richmond used BART and in-lieu local credits gained from BART construction to expand its downtown renewal project. Subway construction in the Mission and use of right of way of other transportation facilities (railroad in Richmond and freeway through Rockridge) minimize long-term environmental effects of BART, while the construction period of four years disrupted commercial activity in the Mission corridor. Development restrictions and weak demand in the Mission and Richmond have prevented BART-induced development in these two areas. Richmond's limited success in attracting employers to the redevelopment area can be attributed mostly to BART expectations. A poor market, and poor BART service (no direct connection to date to San Francisco) have been the limiting factors. Both the Social Security Administration and a Kaiser medical clinic located in the station area as a result of BART proximity; however, early Richmond plans also called for a regional shopping center to be built in the renewal project, but developers elected to use a site more central to the trade area, several miles away with direct freeway access, but without direct BART access. Current plans are more oriented to a regional service employment center (keyed in part to the Social Security Administration) with supporting higher density residential development. To date, the demand for market rate housing has been limited and little has been built in the Richmond station area, even though vacant land zoned for residential use is available.

The community organization and rezoning that occurred in the Mission District and Rockridge will be good for community stability and will spur housing rehabilitation in the future. The lack of development opportunities, however, will permanently constrain BART ridership from these areas below anticipated levels. Owners of property who were speculating on private redevelopment will not achieve returns anticipated. In Richmond, local residents have gained from new employment opportunities, but BART generally has had little effect on accessibility and mobility from Richmond, with AC Transit providing equivalent or better service to downtown San Francisco and Oakland at lower cost. Daily station patronage at Richmond was 1,600 in March 1978, one of the lowest in the system. With many downtown Richmond workers living in Richmond or in communities beyond the end of the Richmond line, few trips to Richmond workplaces are served by BART. Rockridge patronage was 2,200 while patronage

at the two Mission stations was 5,700 persons daily. Patronage gains have been greatest at the Mission stations, averaging 14 percent annually, followed by Rockridge (5 percent) and Richmond (5 percent).

Suburban Areas

Walnut Creek and Fremont are two rapidly growing suburban communities 25 and 35 miles respectively from San Francisco. Walnut Creek serves as the retail and office center for central Contra Costa County, but has many residents who are white collar workers employed in downtown San Francisco and Oakland. It has been a desirable, upper middle class suburban residential area for many years. Historically, Fremont was a blue collar community with a substantial industrial and agricultural employment base and a lower proportion of commuters to the central cities, but this image has changed as the city has grown, and commuting south and west to San Jose and the Peninsula, and north to San Francisco and Oakland has increased. Today, Fremont has a small but growing minority population, while Walnut Creek has few minority residents. While Walnut Creek is nearing build-out, Fremont is perhaps 10 years behind in growth, and has many vacant sites available for development.

Original station locations were shifted in both communities; the business community in Walnut Creek did not want the station in the core, and a Chamber of Commerce group recommended a small shift in the location for the Fremont station in order to be on the edge of the projected Fremont CBD.

Both cities have adopted policies to encourage BART-related development in the station areas. In Walnut Creek, policies toward station area development have been changed several times, and there seems to be an underlying community concern with potential high-rise construction. Currently, a mixed use plan and zoning district designation adjoins the station, while in Fremont the general plan calls for housing at 50-70 units per acre in the station vicinity. The station area in Walnut Creek is primarily in low intensity residential and commercial uses, with the exception of one 10-story office building that was located to be near the BART station. Zoning and incentive bonuses have not induced developers to redevelop station area sites privately when vacant sites were available at subtantially lower cost within one or two miles. In Fremont, the minimum density floor of 50 units per acre apparently has constrained station area development to date, as developers have not perceived a sufficient market for high density apartments in suburban Fremont. A 712-unit condominium project to be built at an average density of 50 units per acre on a site within walking distance of BART recently was approved by Fremont, and may represent the first BART-related station area housing project. A small regional shopping center and community hospital adjoin the station on one side.

While the Fremont station area site was vacant, 167 households were relocated from the Walnut Creek station site. BART construction activity did not cause significant impacts in either community, but train noise does increase the ambient noise level for houses located along the at-grade line just north of the Fremont station.

As suggested above, there have been few station area land use changes in these suburban communities resulting from BART service. BART, however, has been a factor in household location decisions in Walnut Creek, both for BART riders and for some non-riders as well. Apparently some home buyers in Walnut Creek see BART as a good hedge against a possible future when congestion on the highways or increased gasoline prices make dependence on the automobile more difficult.

Several developers of housing in Walnut Creek were influenced by BART service, but their projects are not within walking distance of the station, suggesting that BART can and did influence development patterns at some distance from the station in suburban communities with large park-and-ride parking lots. While no completed projects could be identified in Fremont as BART-induced, the level of demand for new housing appears to be greater than it would have been in the absence of BART.

The suburban stations are not served by good feeder transit, in contrast to urban core and some urban residential stations, and the parking lots at both the Walnut Creek and Fremont stations fill up early in the day. Consequently, there is considerable overflow parking on adjacent streets. In Walnut Creek, this parking intrudes on surrounding residential areas, apparently causing a negative effect on property prices which offsets an earlier, positive effect on home prices attributable to BART expectations prior to the initiation of service.

BART patrons from Walnut Creek, Fremont, and the large service areas beyond those communities have gained from the provision of BART service, as accessibility to the downtown employment centers was greatly improved by BART. Approximately 3,900 persons used the Fremont station daily in March 1978, while patronage in Walnut Creek was 3,800. In both communities, ridership has increased steadily, with average annual growth rates of 10 percent in Fremont and six percent in Walnut Creek. Merchants in both communities perceive that BART is responsible for a loss of retail sales to San Francisco and Oakland, but there is no statistical evidence confirming this. The large park-and-ride lots and out-commute orientation suggest that BART's effects may continue to be on corridor rather than station area development in the suburban areas.

CONCLUSIONS

BART's impacts have been greatest in the urban core downtown areas of San Francisco and Oakland. It provided an impetus for public improvements and policies that served to reinforce the core cities. Lack of neighborhood involvement in station location planning and increased citizen involvement in the planning process during and after BART construction led to downzoning in the Mission and Rockridge districts that will diminish the potential for BART-induced development in those areas. The Richmond experience illustrates that BART is not sufficient to increase demand for housing or retail goods in a declining area. The experience in the suburban case study areas has been mixed; while both adopted some policies to encourage BART-related development, weak demand

for higher density, higher-priced housing and insufficient incentives which could lower housing costs have limited station area development. On the other hand, BART has influenced locational and development decisions at some distance from the stations. BART impacts in the case study areas are summarized on the following page.

POLICY IMPLICATIONS

Bay Area decision makers and those contemplating similar rail transit investments might well consider the following policy implications of the Program-Wide Case Studies.

In urban core areas, early planning studies and coordination with redevelopment and other public improvement programs can yield important benefits. Policies to attract office development to a transit-served corridor can be implemented with appropriate development incentives (floor area bonuses for transit station proximity and direct station connections, for example) and disincentives, mainly downzoning outside the core. Downtown retailing also stands to gain if there is regional demand, but without supporting programs to enhance the attractiveness and accessibility of shopping areas, rail transit alone will not have much effect. Finally, decision makers should not expect all these impacts to occur during the first five years of operation; major changes are likely only after years of full service.

In urban residential areas, the importance of citizen participation in corridor studies and route and station selection should not be underestimated. Early citizen involvement can avoid confrontations later on and keep all parties communicating on the same wavelength. Local land use policies should reflect realistic expectations of transit-related development; if the impacts on accessibility and mobility are small, little transit-induced development will occur. Physical blight and social problems can effectively counter well-intentioned policies to develop station areas (e.g., 16th Street, Richmond, downtown Oakland).

In suburban areas, the problems of access and parking warrant careful study. Stations catering primarily to a park-and-ride market should be planned to minimize neighborhood impacts. Station areas slated for intensive transit-oriented development should be selected only if market studies justify demand projections, and the local circulation system could accommodate the additional traffic. Early development should not be expected. Housing and office uses that may generate walk-in transit patronage should be considered viable candidates for suburban station areas with vacant developable land.

Environmental impacts of system operation can be kept at a negligible level through sensitive design. The construction process need not be more than minimally disruptive for at-grade and aerial lines. Subway construction, by necessity, will be more disruptive, partially as a result of the intense nature of development existing in those areas where subway alignments are justified. Every effort should be made to minimize disruption in such areas, and tunnelling (rather than cut-and-cover construction) and "fast track" scheduling should be used whenever feasible.

SUMMARY OF BART'S IMPACTS IN CASE STUDY AREAS, 1962-78

BART Attribute and Impact Category	Urban Core Areas (San Francisco, Oakland)	Urban Residential Areas (Mission, Richmond, Rockridge)	Suburban Areas (Walnut Creek, Fremont)
BART Organization, Planning and Publicity			
Public Action	Land use policy was modified to encourage BART-related development. Beautification and other transit improvements more affected in San Francisco; redevelopment and beautification in Oakland.	Land use policy was modified to restrict BART-related development in Mission and Rockridge; redevelopment was expanded in Richmond.	Land use policy was modified to encourage BART-related development.
Speculation	Minor speculation occurred in Oakland.	Minor speculation occurred in all areas prior to start of service and may be continuing in Richmond.	Minor speculation occurred in Walnut Creek.
BART Acquisition and Construction			
Property Acquisition	Subway construction caused little dislocation in San Francisco; 400 households and 11 acres of commercial and industrial uses were relocated in Oakland.	Subway construction in Mission had little effect; aerial and at-grade construction dislocated 170 and 130 households and 13 and 1 acre of commercial and industrial uses in Richmond and Rockridge respectively.	167 households were dislocated in Walnut Creek; Fremont station area was vacant.
System Construction	Subway construction had a negative effect on retail business for up to 5 years.	Subway construction in Mission had 4-year negative effect on business; few effects elsewhere.	Minimal effects.
BART Service			
Daily Patronage (March 1978)	49,100 trips to downtown San Francisco stations; 13,800 to downtown Oakland. Most work trips come from Contra Costa, Fremont, and Daly City corridors.	5,700 — 2 Mission stations 1,600 — Richmond station 2,200 — Rockridge station Patronage is lower than expected at Mission and Richmond stations. The proportion of BART trips for work purposes ranges from 56 percent in Richmond to 67 percent in Rockridge.	3,800 — Walnut Creek station 3,900 — Fremont station Use of BART for work trips to downtown San Francisco and Oakland is substantial; 64 percent of trips from Fremont are work trips in comparison to 76 percent in Walnut Creek.
Locational Decisions			
- Commercial/ employers	BART was not a decisive factor in San Francisco; but it influenced 3 large employers to locate or remain in Oakland.	BART was key factor in Social Security and Kaiser location decisions in Richmond.	
- Households		Very minor effects occurred in Mission.	BART was a significant factor for some Walnut Creek households.
Development Decisions			
- Commercial/ employers	BART reinforced, possibly accelerated development in Market Street area, but BART was not major location criterion in San Francisco; in Oakland, most new office space in station areas was built in part because of BART.	BART was a key criterion in Social Security Administration and Kaiser Medical building location decisions in Richmond	BART's greatest influence was on one major office building in Walnut Creek.
- Residential			Several projects in Walnut Creek were influenced (not in station area); station area BART-related project was approved in Fremont.
Property prices and Rents	BART had a minor positive effect on commercial rents within 100-200 feet of a station entrance.	BART had an impact on residential property prices in the 24th Street station area of the Mission before service began. It has since disappeared.	BART had a small positive effect on Walnut Creek residential property prices within several hundred feet of a station before service began, and a negative effect since 1972. It also had a positive effect on Walnut Creek commercial rents.
Retail Sales	BART may be reinforcing central city retail vitality.	No effect.	A shift due to BART from Walnut Creek and Fremont to San Francisco and Oakland was perceived; no statistical evidence.
Indirect Environmental Effects	Indirectly BART contributed to noise, traffic, and visual effects of high rise development.	Minimal effects.	Minimal effects
Facilities and Operation			
Environmental Effects	Station plazas improved public areas.	Mission and Richmond station areas were improved.	Traffic in Walnut Creek station area increased; noise along tracks in Fremont is greater than pre-BART.

Speculation has occurred in some station areas, particularly before service began but has not been of sufficient magnitude to justify public intervention.

From a financing standpoint, a value capture policy -- taxing the increases in property values in the vicinity of a station directly attributable to BART (or other rail transit systems) -- is unlikely to yield substantial revenues early in the life of the system. To date, BART's effects on station area property values and rents have been positive but small, and most station area development cannot be solely attributed to BART. Consequently, there appears to be little justification, at least at this time, for building a financing plan around a value capture principle because the value induced by the system simply is not very large.

The leverage BART provided local redevelopment agencies in allowing them to increase project size with local "credits" gained from BART's construction costs suggests much can be gained from community development programs built around multi-year financing of redevelopment projects and other public improvements. While the current federal Community Development Block Grant Program does not recognize the merits of this type of symbiotic relationship, further federal initiatives in this area may be forthcoming with implementation of the Urban Mass Transportation Administration's Joint Development Program.

1. INTRODUCTION

The purpose of this working paper is to present the findings of the Program-Wide Case Studies conducted in the BART Impact Program (BIP). The case studies address all categories of BART impacts in three types of urban areas -- downtown, urban residential, and suburban -- served by BART. The Program-Wide Case Studies are intended to provide an easily readable account of the magnitude and meaning of BART's impacts, focusing on answers to the "what", "why", and "who" questions to give planners and decision makers (both professionals and laymen) a real sense of how BART has impacted a particular community.

By way of background, the BIP -- a major federally funded research study which began in 1972 -- is composed of six major projects covering the full range of impacts likely to be associated with a major public transportation investment: the BART system. Effects on traffic flow and travel behavior, land use and urban development, the environment, the regional economy, social institutions and lifestyles, and public policy all were examined. Changes attributable to BART have been measured against pre-BART and no-BART alternatives in order to place them in perspective. Throughout these studies, questions of incidence -- the distributional effects -- have been of major concern to the Metropolitan Transportation Commission (MTC) and to the BIP's federal sponsors.

Each BIP project conducted studies of BART's impacts in seven pre-selected case study areas (downtown San Francisco, downtown Oakland, San Francisco's Mission District, Oakland's Rockridge District, central Richmond, and the suburban communities of Fremont and Walnut Creek) to provide a common basis for integrating the findings and conclusions into a cohesive statement about the impact process and BART's effects on each community. Responsibility for preparing the Program-Wide Case Study report was assigned to the Land Use and Urban Development (LU&UD) Project, building on the work of all the BIP projects.

The findings and conclusions of the Program-Wide Case Studies should be viewed with the following caveats in mind: First, BART was approved and built during the 1960s -- a period of unparalled growth and economic development in the Bay Area and elsewhere in the nation. Consequently, BART's effects cannot always be isolated easily from other influences affecting travel patterns, central city office construction or suburbanization, to cite only three main determinants. Further, BART was planned as an independent institution without full coordination among existing transportation agencies or with local land use policy. Thus, there was no assurance that the planning assumptions of BART's designers would be implemented by local governments.

BART initiated interim service in 1972 and transbay service linking Oakland and San Francisco began in fall 1974. Night service has been operational since November 1976, Saturday service started in November 1977, and full, seven-day service began in July 1978. During this start-up period the system was plagued with train reliability and service problems which, in turn, have affected patronage and BART's image. Although BART has made significant improvements in this area, its operations still are far from trouble-free. Consequently, many of BART's potential effects may have been constrained by this period of interim

service. How BART's effects, at least on land use and urban development, could be monitored over the next five to 10 years is the subject of a separate working paper prepared by the LU&UD Project.[3]

Three other integrating efforts undertaken in the BIP are worth noting: the Local Policy Implications Project, the Federal Policy Implications Project, and the Implications for the Transportation Disadvantaged Project. Each of these also draws on the findings of the six major BIP projects with the objective of examining the policy implications for local, state and federal decision making. The Program-Wide Case Studies do not duplicate work undertaken in these other projects, but instead look at BART in a community context, documenting the BART experience in each urban area and analyzing and interpreting similarities and differences. Public policy obviously is an integral part of the BART story, but the analysis and interpretation of all BART effects in the case study areas is the main focus of this paper. For a detailed analysis of policy questions, reports of these other projects should be consulted.[4]

ORGANIZATION OF REPORT

To place the case studies in perspective, Chapter 2 presents the overall framework for analysis, summarizing the rationale for a program-wide case study approach. Chapters 3-5 contain the findings of the individual case studies conducted by all BIP projects. Similarities and differences are described, and impacts warranting continued monitoring are discussed. Each chapter concludes with a section on the policy implications of the case study findings. Footnotes to relevant BIP documents are included wherever appropriate.

---

3. John Blayney Associates/David M. Dornbusch & Company, Inc., Recommendations for Long-Term Monitoring (Berkeley: BART Impact Program Land Use and Urban Development Project Working Paper, July 1978).

4. Booz, Allen & Hamilton, Local Policy Implications of BART Development (Berkeley: Metropolitan Transportation Commission, BART Impact Program, forthcoming); Urban Dynamics, Implications for the Transportation Disadvantaged (Berkeley: Metropolitan Transportation Commission, BART Impact Program, forthcoming); Alan M. Voorhees, Federal Policy Implications (Springfield: National Technical Information Service, forthcoming).

2. FRAMEWORK FOR ANALYSIS

OBJECTIVES

In-depth, program-wide case studies of BART impacts were conducted with the principal objective of synthesizing and correlating the analyses performed in all studies within the BART Impact Program. Secondary objectives included (1) investigating how local governments have contributed to or restrained BART's actual and potential impacts on land use and urban development in specific areas, and (2) determining how local land use and development policies and public works programs can be improved to minimize BART's adverse impacts and take maximum advantage of BART's benefits.

To make each case study a comprehensive story about BART's impacts, the following questions were addressed:

- What have been the fiscal, economic, social, environmental, and land use impacts directly and indirectly attributable to BART, and what attribute(s) of BART caused them?

- What are the similarities and differences between study areas and what impacts, if any, might occur in similar urban settings elsewhere?

- Did the communities participate in selection of station locations with specific development policies in mind to capitalize on BART's impacts and to minimize potential adverse effects?

- Were these policies supported by implementation programs and zoning changes following route and station selection?

- What groups were supporters of the policies? Did station area residents, businessmen, and property owners participate in setting the policies and initiate rezoning actions?

- Have the policies and specific development programs been carried out? Have they been changed, and if so, why?

- Were development policies and rezonings the result of concern for expected or feared impacts? Did the anticipated impacts actually occur after BART service? Finally, did implementation of the policies actually reduce negative impacts directly or indirectly attributable to BART?

- Which groups have gained or lost because of benefits or adverse effects directly or indirectly attributable to BART?

  Community taxpayers

  Businesses in the community at large; businesses near stations

  The travelling public residing in the community; those residing outside the community

Persons residing near the station(s)

Minority residents and businesses

Property owners vs. tenants

Households and businesses displaced by BART

- What steps might have been taken or could be taken to mitigate adverse impacts and maximize benefits?

Some of these questions were addressed by the Public Policy Project in its report on Local Policy Implications of BART Development. The objective of the Program-Wide Case Studies was not to duplicate work being undertaken by the Public Policy Project, but rather to examine local land use and development policies and rezoning actions to the extent that they can explain why certain impacts occurred and how the BIP's findings might be transferable to other jurisdictions.

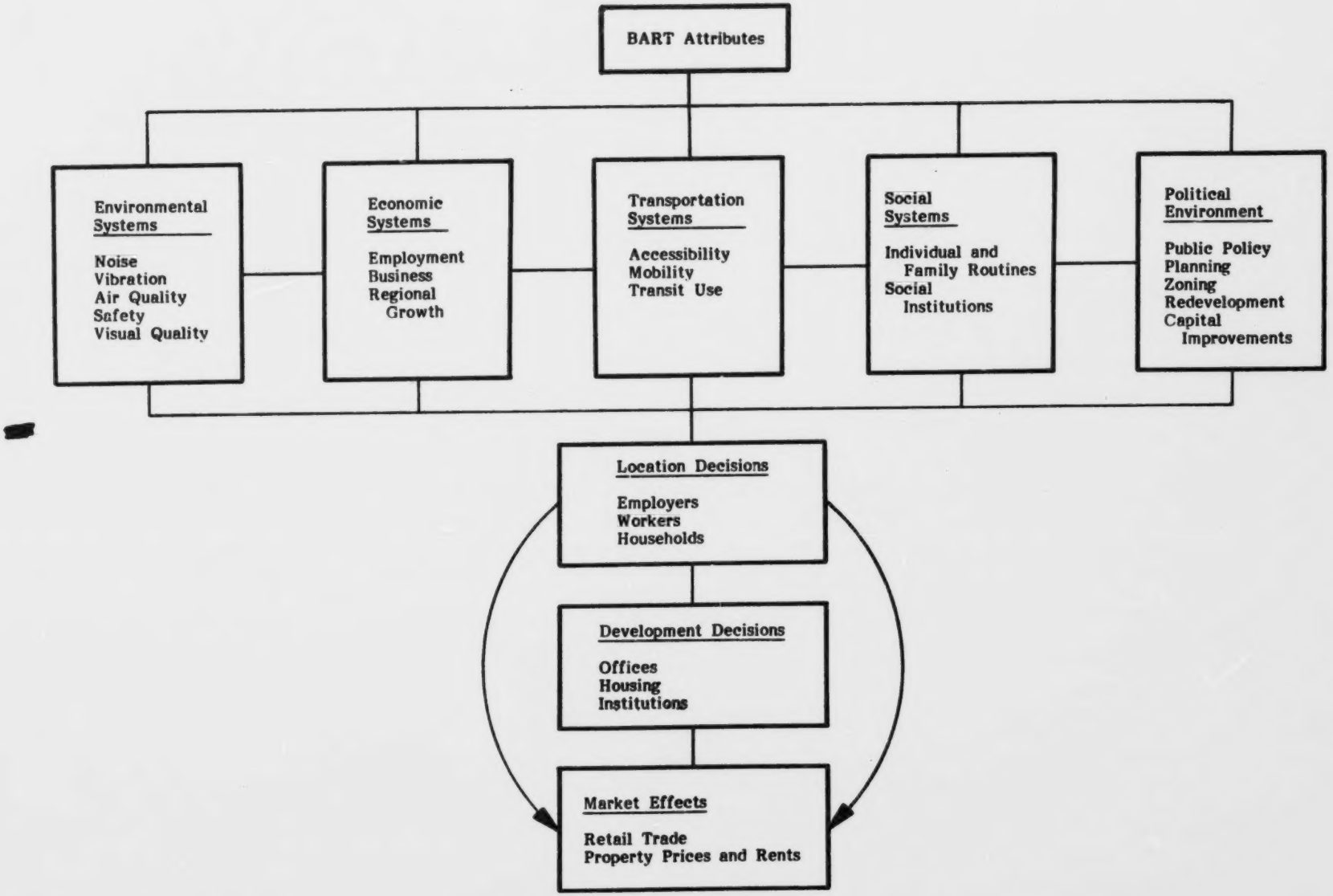
THE IMPACT PROCESS: THEORETICAL PERSPECTIVE

Inevitably, a study of BART's effects is a study of urbanization in the Bay Area during the past 15-20 years. To provide a framework for research, the BIP staff first defined an impact process as the first step in identifying cause-effect relationships and organizing subsequent studies on specific subjects. The impact process illustrates a sequence of events, linking them to specific attributes of BART. Of relevance to the case studies are four of the five attributes defined by the BIP: BART's organization, planning and publicity; the construction process; transportation service; and facilities and operations. The fifth, capital and operating expenditures, was analyzed at a regional scale, as it should be, so differences between case study communities are not apparent.

The BART impact process began with early planning studies in the 1950s; the first major milestone was in 1962 when the $792 million bond financing plan to build the system was approved by the voters in the three county BART District. Then, final decisions were made on route and station locations, and the physical alignment and operating characteristics of the system were established. With construction and the opening of service, further changes in the environment and the transportation system occurred; the final links in the process include perceptions of BART and its impacts -- both actual and expected -- and actions taken in response to them. Figure 1 illustrates this process; the hypothesized effects of each BART attribute are described in the following paragraphs.

Organization, Planning and Publicity -- A newly created transit district with powers, funds, and personnel potentially can affect the policies and programs of other public agencies. Its planning and publicity can raise expectations long before service actually begins, potentially affecting property prices and speculation.

FIGURE 1. THE IMPACT PROCESS



The Construction Process -- This includes the acquisition of land and property to accommodate the facilities needed for a fixed rail rapid transit system, such as trackway stations, parking lots, and maintenance/storage yards. Households and businesses may be displaced as a consequence, and a number of direct environmental effects such as noise, dirt, and traffic disruption, also may occur. Indirectly, these environmental effects may change patterns of shopping, entertainment or business life and be reflected in temporary declines in property prices and rents.

The Transportation Service -- This attribute establishes the specific parameters of the service offered (speed, frequency, comfort, cost, and coverage) and its relationship to other modes of travel, notably ease of transfer to a local bus system and parking availability. The transportation service directly affects travel behavior. In the communities served, it may indirectly cause changes in local air quality by affecting automobile use. Workplace and residential location decisions, retail sales trends, property prices and rents, office and commercial space, station area land use, and housing construction also may be affected. Finally, family routines and the lifestyles of particular groups may change in response to improved or different transportation service.

Facilities and Operations -- The physical structures of the system, such as stations and trackways, and actual train operations are represented by this attribute. The direct impacts are on the environment; indirectly, household and business location decisions could be affected, and property prices and rents may decline because of nuisances such as train noise and vibration.

The No-BART Alternative (NBA)

A hypothetical No-BART Alternative, defined by MTC as the regional transportation system most likely to have evolved had the decision to build BART not been made in 1962, serves as one point of comparison to isolate BART's effects from changes that might have occurred in the absence of BART. Essentially the NBA is the 1971 regional bus system with minor improvements in service.[5] The level of service and capacity provided by the NBA is not intended to equal the transportation system with BART, nor is mobility in the NBA equal to that with BART.

CASE STUDY AREAS

For the Program-Wide Case Studies, three types of urban areas were selected by the BIP staff and contractors, based on population and urban development characteristics, local public policy toward BART, availability of data, and the

5. Metropolitan Transportation Commission, Rationale and Specification of the No-BART Alternative (Berkeley: BART Impact Program Working Note, September 1976), p. 2.

nature and extent of BART's impacts.[6] Downtown San Francisco and downtown Oakland were chosen to represent urban core areas. The Rockridge District in North Oakland, the Mission District of San Francisco, and the area tributary to the Richmond BART station were selected as typical urban residential areas with different concentrations of minority groups. Finally, the areas served by the Walnut Creek and Fremont BART stations were chosen to represent suburban communities (see Figure 2).

The principles governing selection of each case study area are summarized in the following sections.

Urban Core Study Areas

BART is designed to serve commuters working in downtown San Francisco and Oakland, offering them a convenient alternative to the automobile. San Francisco, the economic center of the Bay Area, in many respects is "typical" of regional headquarters cities elsewhere but is separated from many commuters by the Bay. Four subway BART stations located along Market Street serve downtown San Francisco. Downtown Oakland, a smaller core area, is across the Bay from San Francisco. Early in BART's planning a decision was made to have all BART lines pass through downtown Oakland in order to reinforce the City's economic status.[7] With three BART stations, downtown Oakland thus provides a basis for measuring the effect of the improved accessibility offered by BART on core area development.

Urban Residential Study Areas

Three station areas were chosen to represent the broad range of urban residential areas served by BART. The Mission District of San Francisco, served by two subway BART stations and bordered on two sides by industrial and commercial areas, consists mainly of old, high coverage, medium-high density housing. More than 80 percent of the housing units were built before 1940, and more than half of the Mission's 90,000 residents are of minority identity — mainly Latinos. In addition to BART, the Mission is well served by San Francisco Municipal Railway (Muni) buses and streetcars.

The second residential study area, surrounding the Richmond BART station, is a lower density, older neighborhood of mixed land uses and a declining population. Single family homes are interspersed with small, low density apartments built mainly in the 1940s and 1950s. BART was built at grade on a former

6. Metropolitan Transportation Commission, Policy Oriented Case Studies Berkeley: BART Impact Program Working Memorandum, February 1977).

7. Several BART District commissioners representing Alameda and Contra Costa counties strongly promoted such a routing.

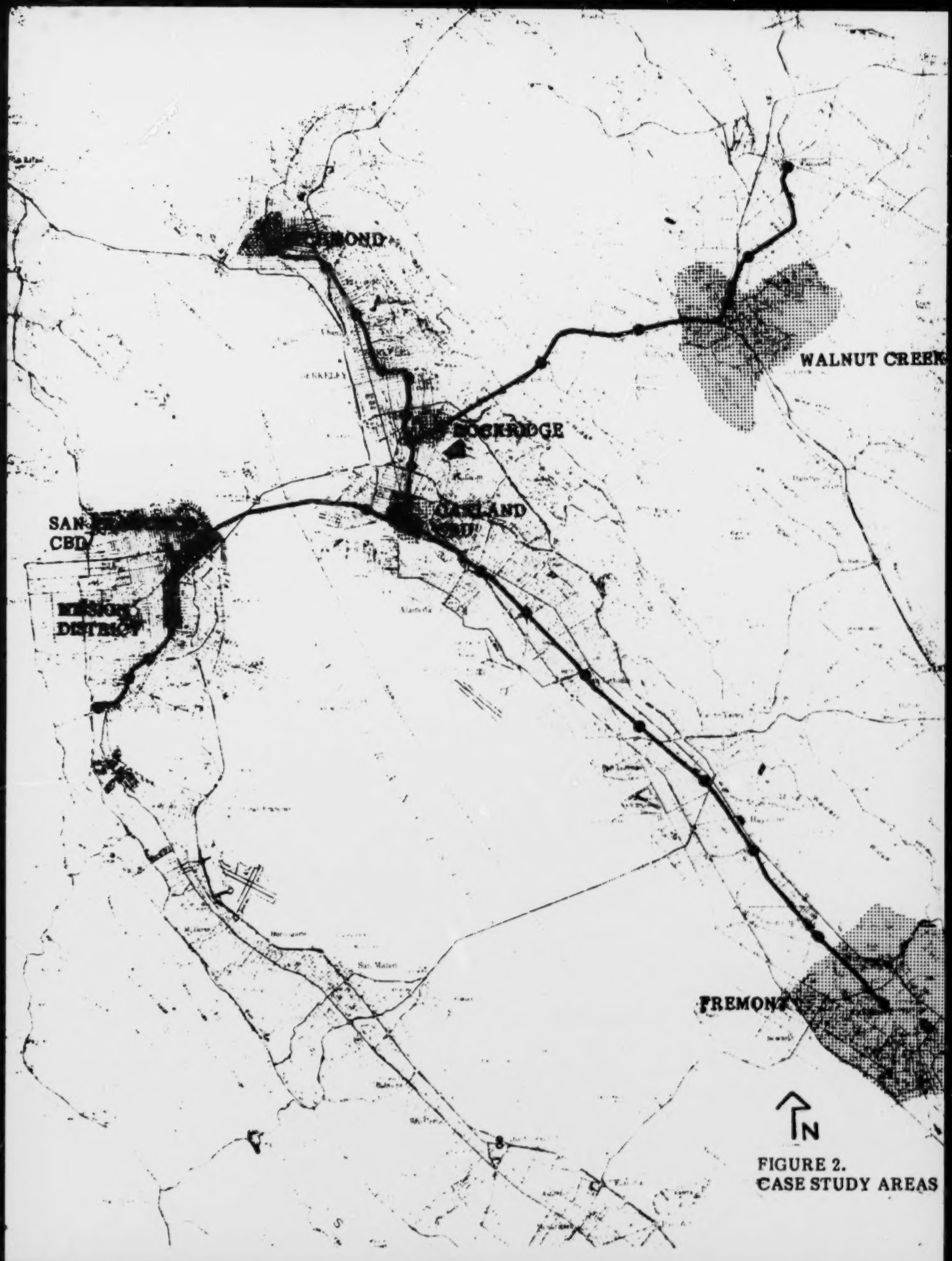


FIGURE 2.
CASE STUDY AREAS

Southern Pacific Railroad station site. West and south of the station, neighborhoods are predominantly black, and areas north of the station show increasing black occupancy. The Richmond study area is of interest because it includes both a downtown renewal area (108 acres) and lower income minority populations -- both of which should benefit from the improved accessibility BART offers.

Finally, the Rockridge District in North Oakland is a moderate density, stable, older area (mostly developed between 1912 and 1930) of mixed land uses with little vacant land available, populated mainly by white, middle/upper middle income residents living in single family homes. BART serves this area with an elevated station located in a freeway median -- an example of a joint-use transportation corridor.

Suburban Areas

Two communities were selected for an analysis of BART's impact on suburban areas. Walnut Creek, whose population (including annexations) grew at an average annual rate of 11 percent between 1960 and 1975, is typical of an upper income suburban center with a relatively high out-commute orientation. Minority representation is low, auto ownership is high, and local transit was quite limited before BART service began. The immediate vicinity of the elevated BART station is an older, loosely built residential area, with auto-oriented retailing on the major thoroughfares.

Fremont, by contrast, has attracted a greater number of middle income and blue collar workers. With the largest territory of any BART-served city, Fremont grew from 44,000 in 1960 to 117,000 in 1977. With an end-of-the-line station, BART has improved Fremont's travel time/cost accessibility to downtown San Francisco more than any other community served by BART, and thus the potential for BART's impacts may be greater than in other suburban communities.

DATA COLLECTION, ANALYSIS, AND INTERPRETATION

For the Program-Wide Case Studies three types of data were collected. First, the relevant social, economic, fiscal, environmental, and land use information served as the basis for a profile of the case study areas accompanied by a chronology of key development decisions related to BART. A parallel effort assembled analyses of BART's impacts by subject and geographic area, drawing on the studies completed in the BART Impact Program. After reviewing the other BIP projects, additional data was collected and analyzed, and key informants interviewed, to complete the picture of BART's impacts on each community. Impacts were analyzed in terms of their magnitude, duration, and geographic coverage, with direct impacts clearly distinguished from indirect impacts.

With the exception of the Land Use and Urban Development Project, all other projects in the BART Impact Program were substantially completed in the 1973-77 time period. Consequently, some data are only current through 1976. Other

data, such as patronage, have been updated to 1978, while housing and office construction records only were examined through the first half of 1977. Station area land use and zoning changes were documented for the period 1965 to 1977 to show pre-BART and post-BART conditions, with a June 1977 cut-off date.

To be consistent with the format of the BART Impact Program Final Report, impacts are related to one of four BART attributes: organization, planning and publicity; construction process; transportation service; and facilities and operations. In some cases, the assignment of an impact to a given attribute may mask important relationships. For example, BART's facilities and operations as well as the transportation service it offers may affect location decisions and property prices and rents adjacent the stations and lines. The case studies should be read with this limitation in mind.

Because the analysis and mapping of station area land use, zoning and general plan changes was undertaken specifically for the Program-Wide Case Studies, the methodology for this is described in some detail. Data collected and analyzed for other work elements of the Land Use and Urban Development Project and other BIP projects is only summarized here; for details on research methodology and data sources, the individual working papers and technical memoranda listed in the Bibliography should be consulted.

Station Area Land Use, Planning and Zoning

Of critical importance in the Program-Wide Case Studies was an understanding of the changes in station area land use, planning, and zoning since 1962 when the BART bonds were approved. The intent of the mapping effort conducted for the case studies was to present in legible, graphic format the changes in land use and planning and zoning policies, including new redevelopment projects and special zoning districts.

Study Areas — Land use and zoning information was mapped for 13 BART station areas within the seven selected case study areas. The BART station study area initially was defined as the area covered by available 1977 aerial photography, a square 4,000 by 4,000 feet centered on the BART station and encompassing 370 acres of land. To further delimit the station area, a 1,500 foot line, representing the outer limit of average walking distance to the BART station, was drawn. The abstract oval-shaped study area boundary created by this definition was refined to reflect the rectilinear city block pattern of the station area and shows as the unshaded portion on the maps.

Data Collection — Land use, zoning and general plan information was collected and mapped for each of the seven study areas. The principal sources of information for station area land use were the aerial and street level photographic surveys and the land use inventories maintained by city and county planning departments.[8] Zoning ordinances, maps and general plans provided by city

8. John Blayney Associates/David M. Dornbusch & Co., Inc., Station Area Land Use (Berkeley: BART Impact Program Land Use and Urban Development Project Working Paper, November 1977).

planning departments were used to define zoning and general planning area boundaries within the station study areas. Information was collected for two time periods: pre-BART, 1960 to 1965; nd post-BART, 1975 to June 1977. General Plan amendments and zoning re.isions since this cut-off date, including the January 1978 rezoning of the Walnut Creek Core Area and a residential rezoning in Fremont, are not included. Data sources for the mapping effort are included in the Bibliography.

Classification and Mapping — The intent of the case study area mapping effort was to provide a basis for comparison of pre- and post-BART land use, zoning, and where available, general plan conditions. Accordingly, a set of two maps is provided for each study area: (1) 1965 Pre-BART Land Use and Zoning, and (2) 1965-1977 Land Use Changes and Zoning. Land use and zoning information was combined on a single map to allow comparison of the actual use conditions with local land use policy. Ten use classifications are shown on the maps. Land use information has been generalized, where necessary, for ease of comparison and discussion, to one-third and one-half block accuracy. Each community's zoning districts were mapped, with the exception of Walnut Creek where to simplify graphic presentation, two single family residential districts (R-10 and R-8) were combined with a duplex residential district (D-3) to form one single family residential category (see Table 1, Allowable Densities in Residential Zoning Districts). Except for Richmond, overlay districts were not mapped because they do not affect the pattern of development in the study area. Only in Walnut Creek and Fremont did the pre-BART and post-BART general plans show significant additional information at an adequately refined scale to warrant inclusion as separate data maps.

Additional information included in the set of land use and zoning maps includes redevelopment area boundaries, major new office buildings constructed since 1965 (over 100,000 square feet), areas of demolition with no new construction, and San Francisco height restrictions.

BART's Land Acquisition and Construction Impacts

The BART Real Estate Department provided detailed information on land acquisition, displacement and relocation, and the disposition of surplus land acquired and subsequently sold for development. Evidence about impacts on retail sales and adjacent properties and environmental effects mainly was obtained from interviews with those involved in the construction process, local officials, and BART personnel. Supplemental evidence was provided by contemporary newspaper accounts, BART's complaint files, and descriptions of lawsuits, and analysis of sales tax data for downtown San Francisco and downtown Oakland.

Accessibility and Mobility

The transit network and zone-to-zone travel time calculations from which the accessibility measures were derived was designed for regional transportation planning for the nine county Bay Area, and was not specifically created for

TABLE 1. ALLOWABLE DENSITIES IN RESIDENTIAL ZONING DISTRICTS
(Minimum Site Area in Square Feet Required Per Dwelling Unit)

San Francisco	Oakland	Richmond	Walnut Creek	Fremont
			R-10 Single Family[a] (10,000 sq. ft.)	
			R-8 Single Family[a] (8,000 sq. ft.)	
	R-30 Single Family (5,000 sq. ft.)	R-1 Single Family (5,000 sq. ft.)	D-3 Duplex[a] (4,500-6,000 sq. ft.)	R-1-6 Single Family (6,000 sq. ft.)
R-1 Single Family (2,500-3,000 sq. ft.)	R-35 Single & Two Family (2,500 sq. ft.)		M-3 Multi-Family Low Density (3,000 sq. ft.)	
	R-40 Garden Apartment (2,500 sq. ft.)			
R-2 Two Family (1,250-1,500 sq. ft.)		R-2 Multi-Family (1,250 sq. ft.)	M-2 Multi-Family Medium Density (2,000 sq. ft.)	R-G-15 Garden Apartment (1,500 sq. ft.)
R-3 Low-Medium Density (800 sq. ft.)	R-60 Medium-High Density (800 sq. ft.)		M-1 Multi-Family High Density (1,000 sq. ft.)	
		R-3 High Density (400 sq. ft.)		
	R-80 High-Rise Apartment (300 sq. ft.)			
R-4 High Density (200 sq. ft.)				
	R-90 Downtown Apartment (150 sq. ft.)			
R-5 Highest Density (125 sq. ft.)				

a. For mapping purposes, these districts have been combined into one single family residential category.

Sources: San Francisco City Planning Code, 1974; Oakland Zoning Regulations, 1977; Richmond Zoning Ordinance, 1976; Walnut Creek Zoning Ordinance, 1978; Fremont Zoning, 1977.

the BART Impact Program. Consequently, the travel time comparisons between BART and the No-BART Alternative should be viewed with a potential error in mind of 10-20 percent. Measures of accessibility (average travel time comparisons) for origin stations were based on a one-to-many analysis (accessibility from one residential location to all major areas of employment), while accessibility measures for the downtown stations were based on a many-to-one (all residential areas to one employment center) comparison. Trip time comparisons reflect actual travel patterns using zone-to-zone trips for weighting purposes.

Demographic Data and System User Characteristics

Data on socio-economic characteristics of BART patrons used in the case study analysis were derived from the 1976 BART Passenger Profile Survey in the case of the origin stations, and from the 1977 MTC Workplace Survey for the destination stations (downtown San Francisco and Oakland stations). Data on characteristics of catchment area populations were obtained either from 1970 U.S. Census tabulations or from the Association of Bay Area Governments-Metropolitan Transportation Commission (ABAG-MTC) Projective Land Use Model QUEST file. BART's monthly patronage reports provided time-series information on ridership levels by station and time period.

Travel Behavior, Shopping, and Location Decisions

Four major surveys were conducted to obtain information on travel behavior, shopping patterns, and workplace and residential location decisions. Three of these were undertaken in the LU&UD Project, while the fourth, the Workplace Survey, was designed mainly to meet the needs of the Transportation System and Travel Behavior (TSTB) Project. The pertinent characteristics of each survey are as follows:

- MTC Workplace Survey: This was conducted in 1977 among workers employed within a set of 88 traffic analysis zones (two to four census tracts in size) readily accessible by BART. This survey had 8,391 responses, an approximately one-in-sixty sampling of the workers in the area surveyed. It focused on mode choice, travel time, work and residence location, and demographic characteristics.

- Households' Location Survey: A study of 315 households and their reasons for moves into Walnut Creek, into the Mission District, and out of East Oakland (see the Study of Households' Location Decisions).[9]

- Downtown Workers Survey: A study of 314 workers who had switched or started work in downtown San Francisco or Oakland during the past three years, a stratified sample including 50 percent BART riders (see the Study of Workers' Location Decisions).[10]

9. See John Blayney Associates/David M. Dornbusch & Co., Inc., Households' Location Decisions (February 1978).

10. John Blayney Associates/David M. Dornbusch & Co., Inc., Workers' Location Decisions , (March 1978).

- Retail Shoppers' Survey: A study of 499 shoppers in six commercial areas, probing their current shopping trips, historic and current shopping patterns, and demographic characteristics (see Study of Retail Sales and Services). Respondents were screened to eliminate people who had not lived in the BART service area for at least three years and to obtain a 50-50 split between BART riders and non-riders.[11]

New Construction and Rehabilitation

The principal source of information on station area construction and rehabilitation activity is the building permit which shows the address of the project, the construction value, the owner/applicant, the number of units proposed or amount of commercial space, and other pertinent data. Monthly construction reports filed by all cities with the Bureau of the Census show total permit activity authorized and list pertinent information on all major projects ($100,000 or more in value). Some jurisdictions maintain records of construction activity for individual planning areas, but most do not.

Retail Sales

Trend data on retail sales were obtained from California State Board of Equalization Annual Reports and the U.S. Census Bureau Census of Business and Manufacturers. Pre-BART and post-BART sales tax data (1970-76) also was obtained from the State Board of Equalization for a sample of stores in downtown San Francisco, downtown Oakland, Fremont, Richmond, Walnut Creek, and 12 other shopping areas which were not included in the Program-Wide Case Studies.

Property Prices, Rents, and Speculation

Data were collected from a variety of sources, including public and private records on property prices and rents, turnover, assessments and exemptions, zoning, etc., and information on trends in commercial and residential prices and rents from real estate indices and key informants.

Indirect Environmental Effects

In assessing the environmental impacts of changes directly or indirectly attributable to BART, most of the information used by the Environment Project was derived from secondary data sources, particularly recent environmental impact reports, and interviews with locally knowledgeable persons. Information about street improvement programs was gathered through site visits and interviews with city officials and project representatives. Newsclippings and project-related information also were used.

11. John Blayney Associates/David M. Dornbusch & Co., Inc., Study of Retail Sales and Services (April 1978).

Key Informant Interviews

To provide a perspective on the BART experience not readily available from published reports or newsclippings, key informants were interviewed for each case study. All told, nearly 200 individuals participated in this facet of the case study work, providing insights on the magnitude and importance of BART's effects and BART's role in the decision making process. Key informant interviews for the LU&UD Project dealt particularly with location and development decisions, and the cases of changes in land use, property prices, tenure, ownership, and shopping patterns. Key informant interview notes obtained from other BIP projects, notably the Economics and Finance, and Institutions and Lifestyles Projects, were critically reviewed, and in some instances follow-up interviews were conducted to clarify ambiguous points or to cover related topics of interest. Those interviewed in the Land Use and Urban Development Project for the Program-Wide Case Studies are listed in Appendix A. For a list of those interviewed by the other BIP projects, the working papers and technical memoranda cited in the footnotes should be consulted.

LIMITATIONS

Several limitations affected the analysis of BART's effects. The first concerns data availability. Obviously not all quantitative data that are desirable are readily available. Some types of data simply do not exist in given jurisdictions, or may exist but not in readily useable form. Potential violations of confidentiality also impose restrictions on data use, particularly for case study areas.

An inherent limitation of the key informant interview technique is that the method necessarily relies on the informant's memory and personal biases. The initial "selling" of BART before the 1962 referendum and subsequent public relations efforts may have generated many preconceptions about what effects the system might have. Another limitation of key informant interviews is that often informants cannot articulate the relative importance of the many factors which enter into a decision.

In several case study areas, redevelopment projects that occurred concurrently with BART construction made it difficult to attribute which effects resulted from BART, and which from redevelopment. Changes in gasoline prices and racial change in neighborhoods also occurred concurrently with BART development and initiation of service, and the differential impacts of these effects can be difficult to separate.

Finally, the case study areas that were selected do not represent the full range of urban and suburban communities; each community has its unique features, and the reader should be cautious about applying these findings to other locations. For example, unique topographic features in the Bay Area limit development to linear corridors which, in turn, dictate the proportion of the population that potentially can be served by a linear, rail rapid transit system.

3. URBAN CORE STUDY AREAS

OVERVIEW

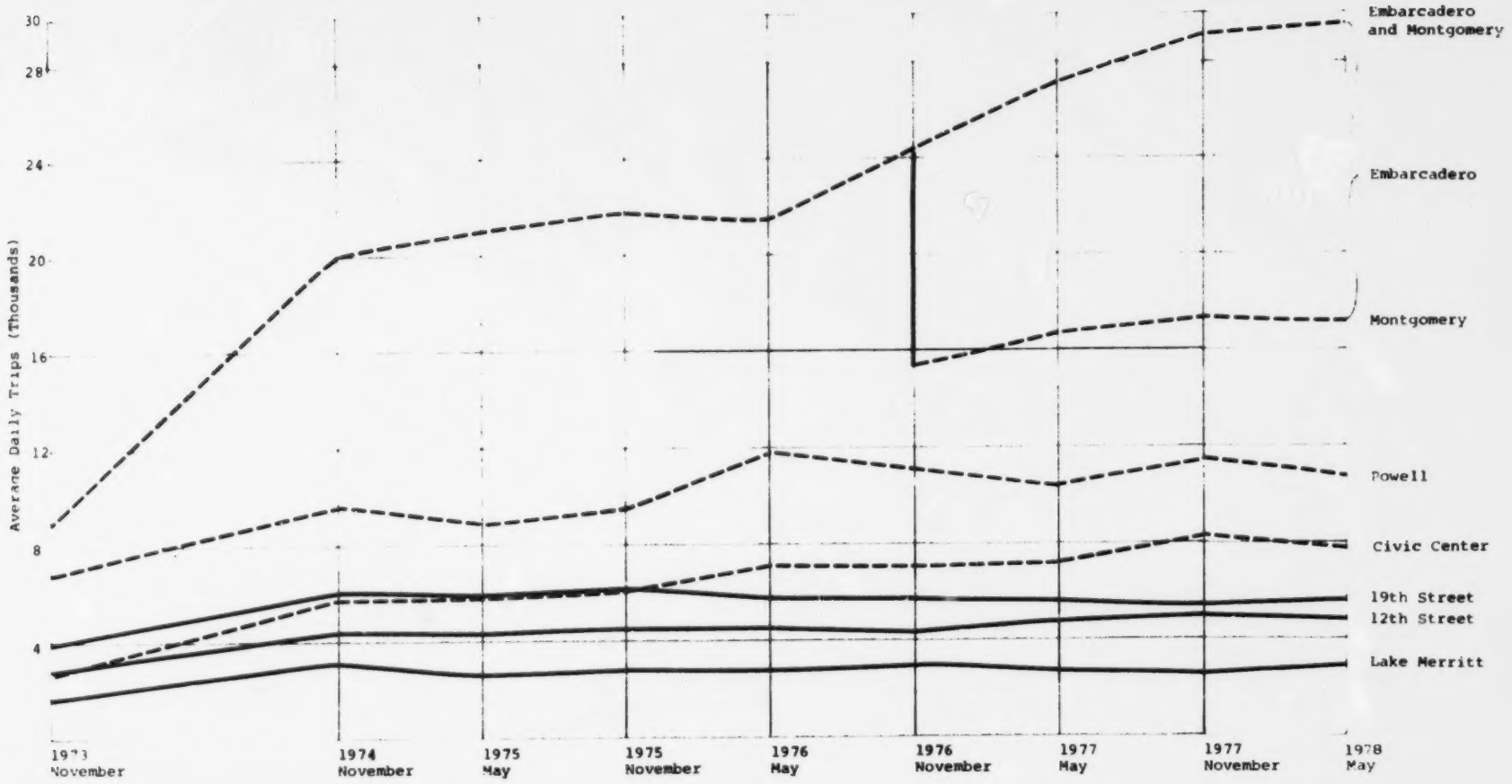
Downtown San Francisco and Oakland are two very distinct areas with varying characteristics, and BART's role has been different in each of them. During the early planning, both before and after the 1962 bond issue, leaders in these cities were concerned with the continued vitality of the downtown areas. There were visible symptoms of urban decay; of great concern was the loss of retail sales and employment to suburban communities, and a fear existed that only low income minority residents would remain in the central cities. For example, the San Francisco CBD share of regional retail sales declined from 13.5 percent in 1958 to 7 percent in 1972, while downtown Oakland's share declined from 5.5 percent to approximately 2 percent.

During the past 15 years, San Francisco has experienced a dramatic shift in its employment base, with the growth in service sector employment -- banking, insurance, real estate, and government -- more than compensating for the loss in industrial and port-related employment. Changes in Oakland have been similar, but the growth in service employment has not been as marked, nor the industrial decreases as large. Total CBD employment in San Francisco is currently about 200,000, while approximately 48,000 are employed in downtown Oakland. As Table 2 indicates, the 1970 demographics of the downtown areas differ, with Oakland having a substantially higher proportion of black and Hispanic residents. The growth of this minority population in the 1950s and 1960s caused Oakland to be labelled as a future "Newark or Detroit", and this image has weakened Oakland's opportunities for economic development.

BART has served as a catalyst for public action for both cities, in San Francisco strengthening an already vital core that was competing with Los Angeles as a West Coast corporate headquarters and gateway city. Demand for office space in San Francisco has been high and increasing. Since 1965, over 23 million square feet of new office space have been built. In Oakland, BART has been a major factor in public and private efforts to bolster the image of the City and to retain existing businesses contemplating a move elsewhere. Demand for office space in downtown Oakland has been relatively weak, and the City is seeking development actively, particularly in and around its 15-block City Center Redevelopment Project.

As Figure 3 illustrates, BART patronage increased steadily in San Francisco, while ridership to downtown Oakland has been relatively stable, despite increases in downtown employment. Marginal service improvements have had little effect on Oakland ridership, while the opening of the Embarcadero station in fall 1976 had a dramatic effect on San Francisco patronage. Only 25 percent of work trips to downtown San Francisco are by auto, a result of excellent transit service within the City in addition to four other regional transit operators serving the downtown.

FIGURE 3. SAN FRANCISCO AND OAKLAND URBAN CORE STUDY AREAS: BART PATRONAGE TRENDS, 1973-78



Note: Embarcadero Station opened on May 27, 1976

Source: BART

Oakland has neither the level of automobile congestion or lack of parking that San Francisco does (50 percent of work trips to the Oakland CBD are by auto), making BART less attractive for trips to downtown Oakland. In the Concord corridor, BART trips to Oakland actually declined when transbay service began. Congestion in station parking lots and on the BART trains resulting from the San Francisco-bound patrons was sufficient to send some Oakland commuters living in central Contra Costa County back to their automobiles.

In the following sections, BART's impacts on downtown San Francisco and downtown Oakland are summarized. Although the impacts are organized in relation to BART's attributes — organization, planning, and publicity; the construction process; transportation service; and facilities and operations — some impacts, such as those on property prices and rents, are caused by several attributes working together. These interrelationships should be borne in mind.

DOWNTOWN SAN FRANCISCO

Setting and Chronology

Downtown San Francisco — flanked by hills to the north and west, the Bay to the east, and an old manufacturing and warehouse area to the south — is the economic and cultural center of the region. The City is accessible from the Marin County suburbs only by ferry and the Golden Gate Bridge and from the East Bay communities only by bridge and BART. San Mateo County shares the Peninsula with San Francisco and also is the residence of many San Francisco workers. Within the City itself, the Municipal Railway (Muni), operating buses, streetcars, and cable cars, provides a high level of transit service.

Because San Francisco is both a city and county, responsibility for government is shared among a board of supervisors, an elected mayor, a chief administrative officer, and 22 boards and commissions. Business leaders and community groups are highly organized and vocal and, as a consequence, have had great impact on local politics. Strong opposition to freeway construction — which has blocked completion of an elevated segment of the interstate system along the City's northern waterfront — along with concern over high-rise construction, have led to denial of several major projects and major rezoning to avoid "manhattanization" of downtown.

BART was planned and built during the 1960s, a period of vitality and growth in the downtown, and opened in the 1970s as an office space boom continued. Following approval of the BART bond issue in 1962, the City embarked on a number of planning and public improvement programs designed to improve the functioning of the downtown and to achieve the City's urban design policies. This sequence of events — BART's construction dates, planning and zoning changes, and major land use changes — is summarized in Table 3.

All told, four BART stations were built in downtown San Francisco, including the Embarcadero and Montgomery Street stations which serve the traditional and expanding business and finance area of the City, the Powell Street station which serves the Union Square central retail and tourist center, and the Civic

TABLE 2. URBAN CORE CASE STUDY AREAS: SUMMARY STATISTICS

	Downtown San Francisco[a]	Downtown Oakland[b]
Employment		
1965[c]	188,800	48,200
1970	165,200	43,200
1975	196,100	48,000
Average Annual Growth Rate (Percent)	.4	-.04
Resident Population		
1960	26,100	18,200
1970	23,500	14,500
1975	30,300	12,200
Average Annual Growth Rate (Percent)	1.0	-2.6
1970 Residents' Demographics		
Percent Black	4.8	25.0
Percent Spanish Surname	7.8	9.4
Median Family Income (1969 Dollars)	8,600	7,600
Average Daily BART Patronage (1978)	49,100	13,800
Embarcadero Station	12,400	
Montgomery Station	17,500	
Powell Station	11,500	
Civic Center Station	7,700	
12th Street Station		5,000
19th Street Station		5,700
Lake Merritt Station		3,100

a. MTC analysis zones: 421-429
b. MTC analysis zones: 142-144
c. The 1965 data for employment may not be accurate.

Source: U.S. Census, Association of Bay Area Governments, BART

TABLE 3. MAJOR MILESTONES IN THE SAN FRANCISCO URBAN CORE CASE STUDY AREA, 1962-78

BART Planning, Construction and Operation	Year	Public Action	Major Station Area Land Use Changes
Montgomery, Powell, and Civic Center station locations adopted; BART bond issue approved	1962	Market Street Development Study completed by SPUR; Downtown Plan adopted	
	1964	Transit Task Force formed; Rezoning reducing allowable floor area ratios adopted; Yerba Buena Redevelopment Project initiated	
Embarcadero station location adopted	1966	Downtown Zoning Study completed	Fox Plaza Building completed; Wells Fargo Bank Building completed
Station construction begins			
	1968	Golden Gate Redevelopment Project area extended to include Embarcadero station; Downtown Zoning Study recommendations adopted; Market Street Beautification Project bond issue approved; San Francisco Redevelopment Agency BART Corridor Study completed	
	1970	Transit Improvement Program approved; City-wide Urban Design Study completed	
Embarcadero station construction begins			Security Pacific Building completed
Montgomery, Powell, and Civic Center stations completed; Interim service begins	1972	Transportation Element adopted; Downtown height rezoning adopted; Muni-BART Transfer Plan, Preferential Street Plan approved	
Transbay service begins	1974		Tishman-Cahill Building completed; Metropolitan Life Insurance Building completed; One Hallidie Plaza Building completed; Levi Strauss Building completed
Embarcadero station opens	1976		One Market Plaza Building completed; State Compensation Insurance Fund Building completed; Marathon Building construction begins; Embarcadero III Building completed; Shaklee Building construction begins
Night service begins			
Saturday service begins	1978		

Center station which serves the governmental/institutional center. The case study area shown on the maps illustrating pre- and post-BART land use and zoning incorporates a band along Market Street from the Ferry Building on the east to Van Ness Avenue on the west.

The basic station location recommendations for the Montgomery Street, Powell Street, and Civic Center stations were made prior to the bond issue in 1962, and were not modified later. Construction began on those stations in 1967 and was substantially completed by 1972. The decision to build the Embarcadero station was made in 1966 by the City of San Francisco; construction began in 1971 and was completed in 1976.

Each BART attribute had a different set of effects on downtown San Francisco. These are described in the following sections.

BART's Organization, Planning and Publicity

Coordination: Station and Route Location, Planning and Design -- In 1962, downtown San Francisco development was guided by the 1955 Downtown Plan and zoning that imposed no effective limit on building height or bulk. The 1963 Downtown Plan, an outgrowth of the 1955 study, addressed BART coordination questions but was not a specific station area plan. In fact, the City had no precise plans of its own for coordination with BART and related development questions as late as 1965.[12]

A major BART design-related land use issue in San Francisco was the construction of the Davis Street-Embarcadero Station at the foot of Market Street, not included in the original system. The Montgomery Street station, half a mile from the foot of Market Street, was located to serve the traditional financial center and to avoid anticipated deep station construction difficulties near the water. In the early 1960s redevelopment had not yet extended the financial district to lower Market Street, so the need for a station there was debatable. BART's refusal to include a Davis Street station led to the City's 1966 decision to pursue station construction using tax increment bonds from the redevelopment area adjoining the station.[13]

BART design probably needed greater coordination in San Francisco than in any other Bay Area city because of the subway construction under Market Street which included the Municipal Railway (Muni) second level subway for the new Muni-Metro line. Prior to the 1962 bond issue, San Francisco's business leaders played a dominant role in BART planning, but were less active thereafter

12. Jacobs, J. and M. McGill, An Analysis of BART-Related Joint Development in San Francisco (San Francisco Planning and Urban Renewal Association, January 1976) p. 8.

13. Booz, Allen & Hamilton, Inc., The Impact of BART on Land Use and Development Policy (Berkeley: BART Impact Program Public Policy Project Working Paper, September 1977 (draft)), p. 24.

except in the context of the Market Street Development Project initiated by the San Francisco Planning and Urban Renewal Association (SPUR) in 1962. This project culminated in a specific plan for Market Street and the downtown BART station areas in 1965, and later resulted in major public improvements, including sidewalk widening and bricking, and the addition of trees, street furniture, and major plazas at the Embarcadero, Powell Street and Civic Center BART stations.

The City also formed interdepartmental committees and task forces to coordinate planning and construction. BART has criticized the Transit Task Force as an impediment to decisionmaking because it barred them from direct contacts with individual departments and often was slow or non-responsive to BART's requests.

Few community groups were formed specifically because of BART. The mayor, however, did appoint a number of advisory committees to work closely with the Transit Task Force.

Impacts on Planning and Zoning — BART mainly served as a catalyst, first for the 1962 Market Street Development Project and then for the 1966 Downtown Zoning Study. BART was viewed as a critical factor by many informants, providing the City with the opportunity to redirect office expansion to the Market Street and south of Market Street area, thus restricting growth to the north and the west.[14] This can be seen clearly by comparing zoning on the pre- and post-BART zoning maps.

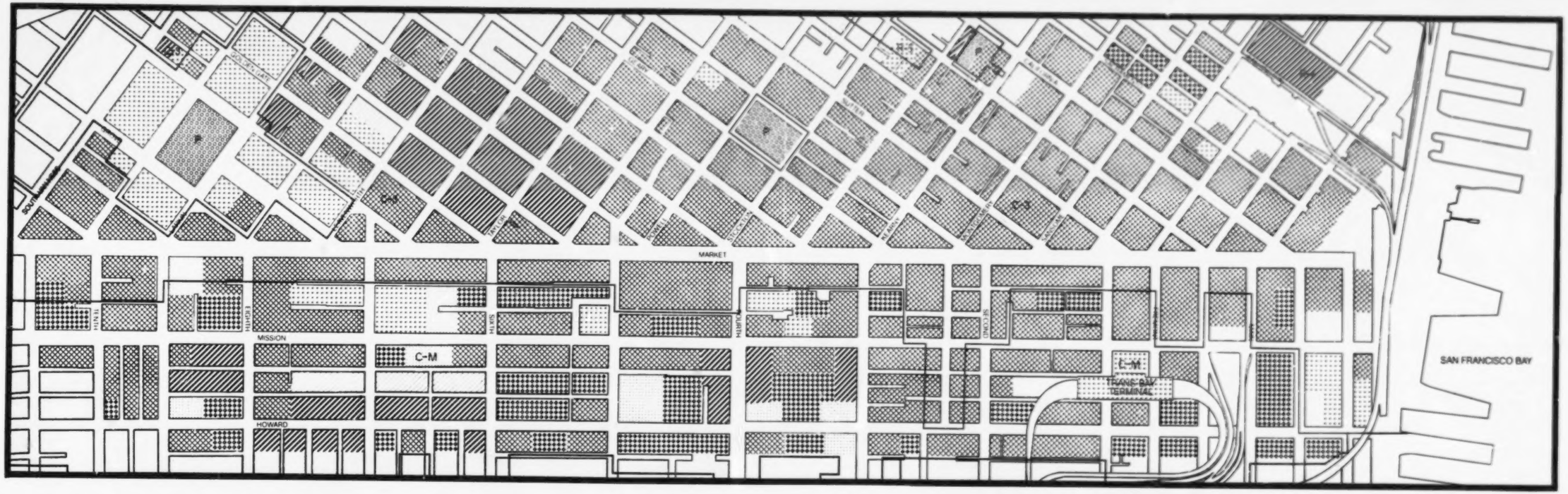
Responding in 1964 to continuous pressure from citizen groups to tighten downtown zoning, the Board of Supervisors reduced the allowable floor area ratios from 20:1 to 16:1 at mid-block and from 25:1 to 20:1 for corner lots. In 1966 the Downtown Zoning Study was begun that led to the 1968 adoption of the basic 14:1 floor area ratio coupled with bonus provisions for direct access to BART stations, proximity to transit stations, provision of plazas, sidewalk widening, and multiple building entrances. The 1968 Zoning Code and Map Amendments provided a 20 percent bonus for direct transit access or up to a 10 percent bonus for transit proximity (for buildings within 750 feet of a BART station). The 1968 amendments also shifted the highest density zone to the south (it was extended from one-half block south of Market Street to two and one-half blocks south of Market and reduced by several blocks on the north and west; thus shifting the highest density zone to the Market Street transit corridor).

Although three new office buildings have, or are slated to have, direct mezzanine access to BART, two are buildings that were approved prior to the 1968 amendments, and thus only one new building has used the 20 percent bonus available. (Five other buildings recently completed or currently under construction could have used the bonus for a direct tie-in, but did not.) Nine buildings have used the station proximity bonus. With completion of the 1971 Urban

14. Ibid., pp. 38-44.

SAN FRANCISCO STUDY AREA MAPS

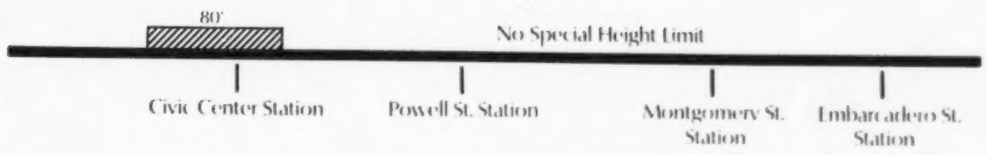
22A



DOWNTOWN SAN FRANCISCO
1965 PRE-BART LAND USE AND ZONING

CIVIC CENTER • POWELL • MONTGOMERY • EMBARCADERO STATION AREAS

North



1965 DOWNTOWN SAN FRANCISCO HEIGHT LIMITS
Market Street Section Vertical Scale 1" = 600'

LAND USE

- Residential
- Residential over Commercial
- Commercial and Office
- Industrial
- Public and Institutional
- Park Open Space
- Vacant
- Parking

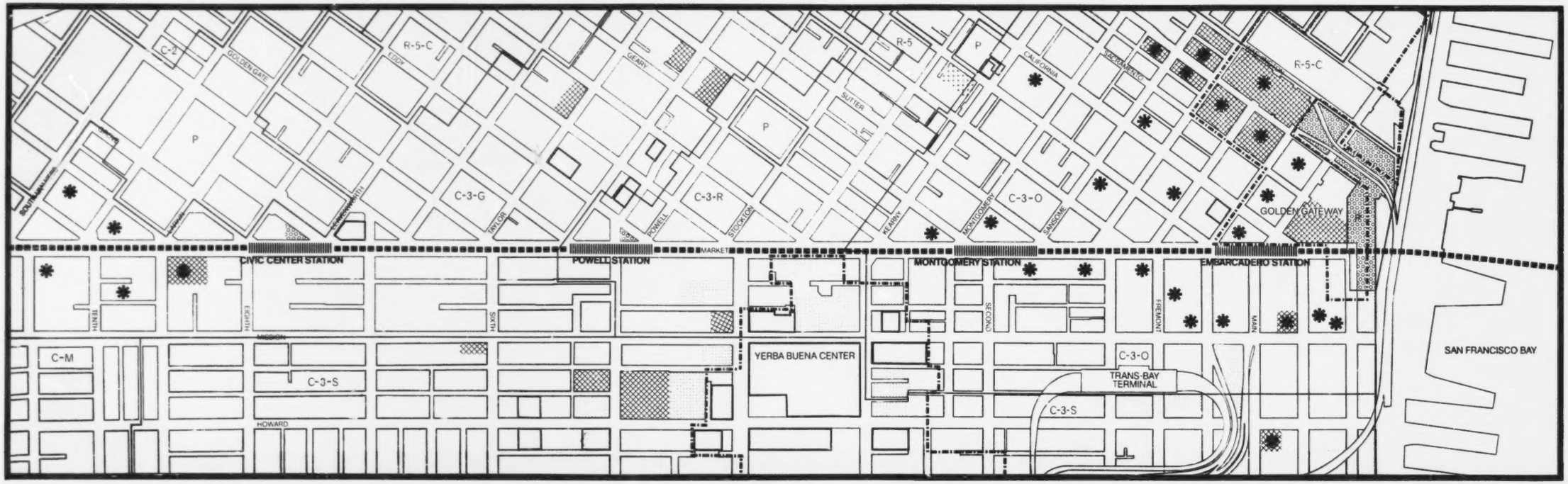
1965 ZONING

R-4	High Density Residential
R-5	Highest Density Residential
C-3	Central Business
C-M	General Commercial
P	Public Use

22-B

BLANK PAGE

BLANK PAGE



DOWNTOWN SAN FRANCISCO
1965-77 LAND USE CHANGES AND ZONING

CIVIC CENTER • POWELL • MONTGOMERY • EMBARCADERO STATION AREAS

North
200' 400' 600'

LEGEND

- Redevelopment Project
- Major New Building (over 100,000 sq.ft.)
- Demolition (no new use)

BART

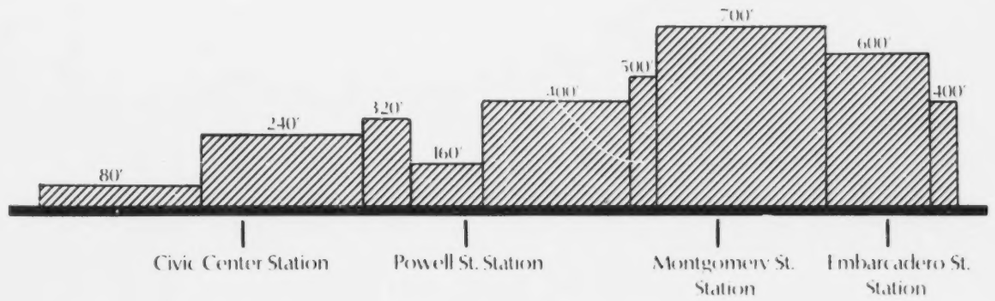
- Station Platform
- Parking
- Subway Line
- Surface Line
- Aerial Line

LAND USE

- Residential
- Commercial and Office
- Public and Institutional
- Park Open Space
- Vacant
- Parking

1977 ZONING

R-5	Highest Density Residential
R-5-C	Highest Density Residential Community Business
C-2	Community Business
C-3-O	Downtown Office
C-3-R	Downtown Retail
C-3-G	Downtown General Commercial
C-3-S	Downtown Support
C-M	Heavy Commercial
P	Public Use



1977 DOWNTOWN SAN FRANCISCO HEIGHT LIMITS
Market Street Section Vertical Scale 1" = 600'

22-C

Design Plan, height and bulk limits were changed, with the highest height (700 feet) permitted only in an eight-block area surrounding the Montgomery Street BART station, as the inset diagram on the map of 1965-77 Land Use Changes and Zoning illustrates. The Civic Center Plan also was modified to incorporate the proposed U.N. Plaza, but relocation of the proposed Performing Arts Center to a site adjacent to the Civic Center BART station was rejected. In this latter instance, the potential benefits of a station area location were judged insufficient.

Impacts on Redevelopment Projects -- The City expanded the redevelopment boundaries of its two downtown projects, Yerba Buena Center and the Golden Gateway, to include the BART station areas, thus enabling the City to take advantage of non-cash credits to obtain more federal matching funds. (The Department of Housing and Urban Development allowed other public expenditures within redevelopment area boundaries -- such as BART construction costs -- to be counted as part of the required one-third local share of project costs.)

Impacts on Local Government Expenditures -- Three public improvement projects were initiated in response to BART at a total cost of $50 million, partially offset by $20 million in outside funding.[15] These include the Embarcadero/Muni station, the Market Street Development Project, and the mezzanine extensions, plazas and street extensions in the BART station areas. Although BART built the Muni-Metro subway and stations, San Francisco has spent $60 million as its 20 percent share of the capital costs of the streetcars, rails, and electrification that will be used in the new system. Other municipal costs associated with Muni-Metro, such as a new maintenance facility, and street beautification on upper Market Street could be considered BART-related as well.

BART's Construction Process

BART's Property Acquisition -- Because BART runs in a subway through downtown San Francisco, very little land was acquired and no households were displaced. All told, 2.1 acres, occupied by commercial and other uses, were purchased, of which only 8,000 square feet was classified as surplus.

Construction Impacts -- With downtown cut-and-cover construction for the Market Street stations, followed by the Market Street Development Project and related Muni-Metro construction, access to stores was impaired and some stores reported declines in sales. Many retailers objected to construction

15. Booz, Allen & Hamilton, Inc., The Impact of BART on Local Government Expenditures, Revenues, and Financial Policies, July 1977, pp. 24-28.

impacts; however, BART made a major commitment to respond to all complaints. The closure of some stores was attributed, at least in part, to BART construction, but otherwise no adverse long-term effects have been noted. The construction period may have had more adverse effects on smaller stores that could not withstand several years of reduction in sales compared to larger or chain-type stores. The construction signified a commitment to a transit corridor along Market Street and was one of several important factors encouraging new office development.

Environmental Impacts — The long period of cut-and-cover subway station construction along Market Street (May 1967 to February 1973) had a substantial adverse effect; access was impaired and traffic hazards increased. Streetcars, buses and autos frequently were rerouted from one side of the street to the other, and in some cases moved onto adjacent streets. To make room for storage of construction materials and equipment, sidewalks in many locations along Market Street were narrowed from 22 feet to between 10 and 15 feet. Noise effects were minimized by using sonic pile drivers and building vaults to house heavy construction machinery.[16]

BART's Transportation Service

Impacts on Travel Behavior — BART shortens the average work trip travel time to downtown San Francisco by about four minutes, reducing the average transit trip time from about 34 minutes under the assumed No-BART Alternative to 30 minutes with BART — an 11 percent savings. During off-peak travel periods, the savings with BART drops to just under three minutes (9 percent). The average shopping trip to downtown San Francisco takes 27 minutes on BART versus 30 minutes under the No-BART Alternative.[17]

In March 1978, about 49,100 daily BART trips started or ended at the four stations serving downtown San Francisco, or about 34 percent of the 144,000 daily trips on BART. Approximately 48 percent of all trips to downtown San Francisco were made in the two-hour peak AM period. A breakdown of the trip patterns shows that for all trips ending at the four urban core stations on Market Street, 8 percent originated at another of the four stations, 36 percent began at other West Bay stations (Mission through Daly City), 12 percent began at Oakland CBD stations, 5 percent from Richmond line stations, 15 percent from the Fremont line (Fruitvale and south), and the largest portion of transbay patrons began their trip from the Concord line -- 24 percent of those with downtown

16. Gruen Associates, Inc., Environmental Impact Project Case Studies (Berkeley: BART Impact Program Environmental Project Working Note, September 1977), p. 3.

17. John Blayney Associates/David M. Dornbusch & Co., Inc., Accessibility Mapping (September 1977), p.12.

San Francisco destinations. The predominant purpose of trips to the San Francisco urban core is for work.[18]

A socio-economic profile of BART users whose morning trip started from one of the four downtown stations shows that many more were male (63 percent) than female (37 percent). Most (69 percent) were white, 12 percent were black, 13 percent were Asian, and the remaining 6 percent were mostly Spanish-Americans. About 39 percent of the users had four or more years of college education, and 42 percent had family incomes over $15,000 in 1976, according to the 1976 BART Passenger Profile Survey.

A comparable socio-economic profile of BART riders whose morning trip ended at the downtown stations (who are workers in the downtown San Francisco zones adjoining the stations) indicates 48 percent were male, 64 percent were white, 17 percent Asian, 11 percent Spanish, and 7 percent black. About 36 percent had four or more years of college, and 62 percent had family incomes of $15,000 or more in 1977. None of the socio-economic characteristics of BART riders among downtown San Francisco workers were significantly different than non-BART riders, according to the 1977 MTC Workplace Survey.

Compared to other BART stations, the San Francisco urban core stations have the largest number of connecting bus lines; most serve all four stations. The Montgomery and Embarcadero stations have 36 connecting bus lines, Powell has 25 lines, and Civic Center has 22. Though these stations have excellent connecting bus service, they have poor park-and-ride access because BART does not provide free parking. About 90 percent of BART users who live in San Francisco take the bus or walk to and from BART; for non-San Franciscans commuting in to work, about 95 percent walk to and from the downtown stations. Approximately 80 percent of these BART commuters need walk no more than eight minutes to reach their workplace.

Impacts on Workers' Location Decisions -- Among San Francisco workers surveyed who recently have changed jobs, half considered proximity to BART in their job location decision. BART's relative importance increases when transbay commuters are considered separately from people living and working within San Francisco where the Muni provides good service. Of the transbay commuters working in San Francisco, 57 percent stated they looked for work with the idea of using BART for commuting, and 57 percent stated that proximity to a BART station was a definite consideration in their decision to take their present job.[19]

---

18. See BART Passenger Profile Survey and Peat, Marwick, Mitchell & Co., Travel Data For BART Station Area Case Studies (Berkeley: BART Impact Program Transportation System and Travel Behavior Project Working Note, May 1977).

19. John Blayney Associates/David M. Dornbusch & Co., Inc., Study of Workers' Location Decisions, pp. 14-25.

Impacts on Office Construction — Since 1960, office construction has flourished in downtown San Francisco, averaging 1.2 million square feet per year. Within 1,500 feet of a BART station over 23 million square feet of new space was built since 1965. Most new office buildings have been constructed within five blocks of the four downtown BART stations, but this is not directly attributable to BART. The business district is compact and constrained on three sides by water, steep hills, and zoning, leaving Market Street and the area south of Market as the logical directions for expansion.

In the 1950s, Market Street marked a definite boundary of the prestige office area. Buildings offering space for lease were not built along Market Street, much less south of Market, because of the allure of locating within the established north of Market Street business district and the unattractiveness of the Market Street area -- its width was a barrier and the manufacturing-wholesaling-skid row image south of Market hurt. The first major post-war building on Market Street was the Crown Zellerbach Building (340,000 square feet) built in 1959. During the next nine years, two more office buildings were completed along Market Street (Fox Plaza — 310,000 square feet and Wells Fargo Bank -- 717,000 square feet). Between 1969 and 1975, seven new office buildings were completed, adding 4.8 million square feet to the supply of downtown office space. In fact, during the past 17 years, the proportion of San Francisco's major new office floor space constructed south of Market Street steadily increased from none before BART to 33 percent during BART's planning phase, to 50 percent during BART's construction, and to 88 percent after transbay operation began. Office space constructed within one-half block of Market Street climbed from none pre-BART (1960-62) to about 25 percent of the City's volume during BART's planning and construction and 50 percent after BART initiated transbay service.

Several factors contributed to this shift. Land availability along Market Street was extremely important. Cheaper, larger sites were available south of Market than in the older financial district. Access to various transportation modes, including BART, also induced the shift toward Market Street. With ferries to Marin County, buses to the East Bay, Muni service to the rest of San Francisco, and easy freeway access — the Market Street spine clearly provided the best transportation to the region.

BART's most significant contributions to the shift of office construction towards Market Street were indirect. Notably, BART facilitated implementation of the Market Street Development Project and the 1966 Downtown Zoning Study, both major contributors to redirecting office growth toward Market Street. (See map of 1965-77 land use changes and zoning.)

When asked about specific BART impacts, key informants identified seven buildings attributable in some degree to BART. These represent about 10 percent of the total office space built or under construction in San Francisco since 1965.

The shift toward new office construction on Market Street has not been accompanied by a corresponding increase in office building alterations and additions. Major ($100,000 or more) and minor (less than $100,000) alterations and additions

within two blocks of the downtown BART stations have decreased proportionally as a share of total alterations and additions in San Francisco.[20]

Impacts on Employers' Location Decisions — According to employer key informants, firms locating in San Francisco do not rank access to the labor force very highly among their location decision criteria. The limited importance may be a result of the Bay Area's excellent regional highway system and commuter transit systems (bus, conventional rail, ferry, as well as BART). Historical location, the prestige of a San Francisco location, shops and restaurants, and good transportation access by a variety of modes are frequently given as reasons for a San Francisco location. However, several employers, particularly governmental agencies, felt BART was an important determinant in location decisions.

As traffic congestion and other impediments to commuting worsen, BART may have an increasingly important effect on continued centralization. Thus, although BART has not been solely responsible for firms' decisions to move to the central city, it may serve to prolong the life of central cities (by increasing corridor capacity and reducing congestion) as attractive locations in which to do business.

Impacts on Retail Sales — Retail sales in downtown San Francisco declined 11 percent (in real dollars) from 1958 to 1972, as shoppers increasingly patronized newly-built suburban shopping centers.[21] Two of six key informants (Woolworth's and Macy's) stated that their sales recently had increased in part because of BART. Analysis of a survey of downtown shoppers indicates a shift in shopping patterns back to San Francisco, partly attributable to newer shoppers riding in on BART.[22] Approximately 73 percent of the new shoppers (using the area for less than three years) rode BART, as opposed to 60 percent of the long - term shoppers. More than 40 percent of the new shoppers surveyed in San Francisco said that BART service had induced them to shop in downtown San Francisco. These shoppers, however, constitute less than 5 percent of the shoppers surveyed in the downtown, and San Francisco's retailers are not yet locating new stores in response to BART.

20. John Blayney Associates/David M. Dornbusch & Co., Inc., Study of the Office Construction Industry (August 1977), p. 25.

21. U.S. Department of Commerce, Census Bureau, Census of Business and Manufacturers, Major Retail Centers--California, 1963 and 1972 editions, (Washington, D.C.: U.S. Government Printing Office).

22. John Blayney Associates/David M. Dornbusch & Co., Inc., Study of Retail Sales and Services (April 1978).

Impacts on Property Acquisition and Occupancy (Speculation) — Due to the increased attractiveness of the lower Market Street area for corporate headquarters and other, major office construction, and to policies that tended to discourage property turnover, no significant speculation has recently occurred in downtown San Francisco. Further, high asking prices discourage all but long-term investment which is distinguished from speculation as defined in this project. BART may have had an "anti-speculative" effect by virtue of its long-term enhancement of the downtown.

Impact on Office Rents — Multi-variate regression analysis of trends in downtown San Francisco office rents indicates that BART may have had a slight positive impact on rents in nearby buildings. While there was no anticipatory effect on rents prior to 1972, between 1977 and 1978 office rents in relation to new construction cost decreased less in the proximity of BART than elsewhere in the San Francisco downtown area (approximately 2 percent at 100 feet from a station entrance).[23]

Indirect Environmental Effects — As with all downtown construction, BART-related office development has affected the site-specific climate of the downtown area and the visual environment. Sound levels, air quality, energy demand, and safety/security also have been affected. Street-level winds increased, an effect intensified at building corners and within arcades. In the new buildings, occupants' views have been both created and obstructed. The pedestrian's sense of spaciousness is constricted by tall buildings, and the shadows cast reduce the amount of street level sunlight. High levels of construction noise are inevitable. Air pollutants are sometimes trapped between buildings at ground level due to the canyon effect when the air is relatively still; when winds are blowing, however, this effect is countered by increased street-level winds.

New development has substantially increased downtown demands for water, gas and electricity, but this is largely a transfer of demand rather than an absolute increase in Bay Area resource requirements. Crime and security problems in the downtown area have increased over time, but not disproportionately in relation to increased crime levels throughout the City. Pedestrian and vehicular traffic safety has not changed noticeably in recent years.

Finally, downtown San Francisco development is largely built in an artificial fill area which is subject to strong earth movement in the event of an earthquake along the nearby San Andreas or Hayward faults. However, most new buildings have been designed to minimize potential damage from earthquakes. Some of the area is also subject to subsidence and liquefaction.

The Market Street Development Project, indirectly attributable to BART, involved extensive change between the Ferry Building and the Central Freeway Overpass.

23. John Blayney Associates/David M. Dornbusch & Co., Inc., Study of BART's Effects on Property Prices and Rents (July 1978).

Sidewalks were widened and resurfaced with brick, a double row of sycamore trees was planted, and street furniture of bronze/granite/glass was installed. Major plazas were built at the Embarcadero, Powell Street and Civic Center BART stations. The Market Street design is effective and well executed. It integrates BART and Muni with the street, provides well for street activity, and creates a pleasant, pedestrian-oriented environment.

BART's Facilities and Operations

Environmental Impacts -- For the most part direct environmental impacts around downtown San Francisco subway stations are minimal or nonexistent.[24] The system is underground so there is no noise impact to the surrounding area. Vibration levels are no greater than those produced by vehicular traffic on the surface street. There are no localized microclimate impacts or permanent barrier effects associated with the stations, and there has been no significant impact relative to traffic and pedestrian safety or crime activities since BART became operational. With the line and stations in subway there are no above-ground visual impacts. The elevators and stair/escalator openings are visually unobtrusive, and plazas at several stations are environmental improvements over prior conditions.

DOWNTOWN OAKLAND

Setting and Chronology

Downtown Oakland, 7.5 miles east of San Francisco across the Bay, is attractively situated on the Bay plain in a location highly accessible from San Francisco and other East Bay communities. All four BART lines pass through Oakland, and the downtown also is well served by highways and transit. Further east lie the Berkeley hills which separate Oakland from the central Contra Costa County suburbs.

Oakland is typical of other, older cities its size with a council-manager form of government and strong fiscal conservatism. Oakland also has a substantial black population and, since 1977, has had a black mayor. Faced with a declining downtown, BART coupled with several major redevelopment projects was viewed as a key factor in the revitalization of the core area. However, delays in completion of a major freeway segment to serve the downtown have adversely affected several major downtown projects, most notably the City Center project. Major milestones in downtown Oakland's post-1962 history are summarized in Table 4.

The downtown Oakland case study area shown on the pre- and post-BART land use and zoning maps includes the 19th Street and 12th Street-City Center stations

24. Gruen Associates, Inc. Environmental Impact Project Case Studies, p. 3.

TABLE 4. MAJOR MILESTONES IN THE OAKLAND URBAN CORE CASE STUDY AREA, 1962-78.

OAKLAND DOWNTOWN

BART Planning, Construction and Operation	Year	Public Action	Major Station Area Land Use Changes
Station locations adopted BART bond issue approved	1962	Rapid Transit Advisory Committee formed	
	1964	Mayor's Rapid Transit Committee formed; Zoning ordinance revisions adopted; City Center Redevelopment Project initiated	
Station construction begins	1966	Central District Plan adopted	
	1968	City Center Redevelopment Plan adopted; Funding approved	Kaiser Ordway Building construction begins; World Savings Building construction begins; Clearance of redevelopment area begins
	1970	Rezoning adopted increasing allowed CBD commercial density; City Center Redevelopment Project area increased to six blocks	Broadway Beautification Project begins
Stations completed	1972	City Center Redevelopment Project area increased to 15 blocks	Wells Fargo Bank Building construction begins; World Savings Building completed; Blue Cross Building construction begins; Broadway Beautification project completed; Wells Fargo Building completed; Blue Cross Building completed
Interim service begins	1974		Clorox Building construction begins
Transbay service begins	1976	Rezoning adopted reducing parking requirements near BART stations; Major General Plan revision begins	Clorox Building completed
Night service begins			
Saturday service begins	1978	Grove Shafter freeway extension funding approved	

which serve the downtown Oakland office and retail core, and the Lake Merritt station which serves the governmental, educational, and Chinatown areas (County administrative center, Museum, and community college). Station locations were not modified after the initial recommended locations, and cut-and-cover construction for the stations occurred between 1966 and 1970.

The decision to run all BART lines through downtown Oakland was made in order to reinforce Oakland's lagging position in the Bay Area economy. Such an alignment was highly recommended by several directors, and engineering alternatives to this never were evaluated seriously.

BART's impacts in downtown Oakland are summarized in the following sections in terms of the attributes causing the effects.

BART's Organization, Planning and Publicity

Coordination: Station and Route Location, Planning and Design — Major post-1962 BART design issues in downtown Oakland included: (a) the location of BART headquarters at the Lake Merritt Station; (b) the 12th Street Station plaza; (c) the location of BART in the Grove-Shafter freeway median north of downtown; and (d) modification of the 12th Street station to tie into an expanded redevelopment project. In all cases, negotiations between the City and BART were successfully completed. However, Oakland made few organizational changes in response to BART "in part because it did not view BART as an opportunity," according to several informants.[25] The only changes were the formation of the Rapid Transit Advisory Committee in 1963, and creation of a BART liaison staff position. Local merchants and property owners generally were not enthusiastic about BART, but did form three specific committees: The Rapid Transit Committee of the Central Business District, the Broadway Task Force Committee, and the Greater Downtown Oakland Promotion Committee.

Impacts on Planning and Zoning — BART had an impact on downtown planning efforts, notably the 1966 Central District Plan and the Redevelopment Agency's BART Corridor Study. The recommendations set forth in the Central District Plan provided the basis for major downtown rezonings which were completed late in 1970. These included both the redefinition of existing zoning districts and introduction of new districts as well as changes in zoning boundaries. The 1966 Plan proposed an intensification of commercial development for the central core area and the imposition of slight development limitations in areas peripheral to the core. Although the two new zoning districts adopted as part of plan implementation do not reflect the floor area ratio development incentives proposed for the suggested central zones, the new Central Core Commercial (C-55) District does allow for more retail uses than permitted in the Central Business Service Commercial (C-51) District, and offers the incentive of no required

25. Booz, Allen & Hamilton, Inc., The Impact of BART on Governmental Structure, Organization, and Operations, p.13.

off-street parking — a requirement in the C-51 District. (See Downtown Oakland pre- and post-BART maps for the boundaries of both the old and new zoning districts.

Zoning changes outside the core area include expansion of an existing R-80 zone into the old C-50 zone, retention of the Oakland Commercial Center as the C-52 zone, introduction of the Community Thoroughfare Commercial (C-40) Zone allowing lower intensity commercial development south of downtown, and the Design Review Combining Zones. A BART-related development incentive was approved in January 1976 as a Special Exception to the off-street parking requirements within 600 to 1,500 feet of BART stations, depending on the activity. The reduction in parking space needed varies from 25 percent for residential uses to 50 percent for commercial and office uses, and has affected both a C-51 and an M-30 zone (five and nine block areas respectively) within the Oakland downtown station area.

Changes to capitalize on the BART alignment and station location include the redesign of Broadway and City Hall plazas, the City Center Plaza, and high density residential land use proposals for the Lake Merritt station area.

Impacts on Redevelopment Projects — Using $2 million in BART construction costs as partial, additional local credits, Oakland was able to increase the size of its City Center Project from a $4 million, three-block proposal in 1965 to a $24.5 million, 15-block proposal by 1972. The additional 12 blocks includes the proposed regional shopping center and a park. Completion of the project awaits the completion of the Grove-Shafter freeway with direct access, considered essential for the shopping center. Final approval for the freeway and a commitment by a third department store in fall 1978 cleared the way for completion.

BART also provided $1.7 million in local credits for the Peralta College Redevelopment Project, and it is doubtful whether Peralta's downtown development of the Laney College Campus could have gone ahead without BART. Finally, BART credits provided about 25 percent of the required one-third local share for the Oak Center and Acorn Redevelopment projects, thus allowing expansion of major housing rehabilitation and construction projects several blocks west of downtown Oakland.

Impacts on Local Government Expenditures — In addition to the redevelopment projects, the City initiated several improvements directly related to BART: access between the City Center Plaza and the BART station, the Coliseum walkway to BART, the East 8th Street widening, and the Grove Street widening. BART's major impact on these programs was to provide a convenient vehicle for financing, resulting in a net gain to the City of $1.5-2.5 million if non-cash contributions are viewed as an indirect benefit.

BART's Construction Process

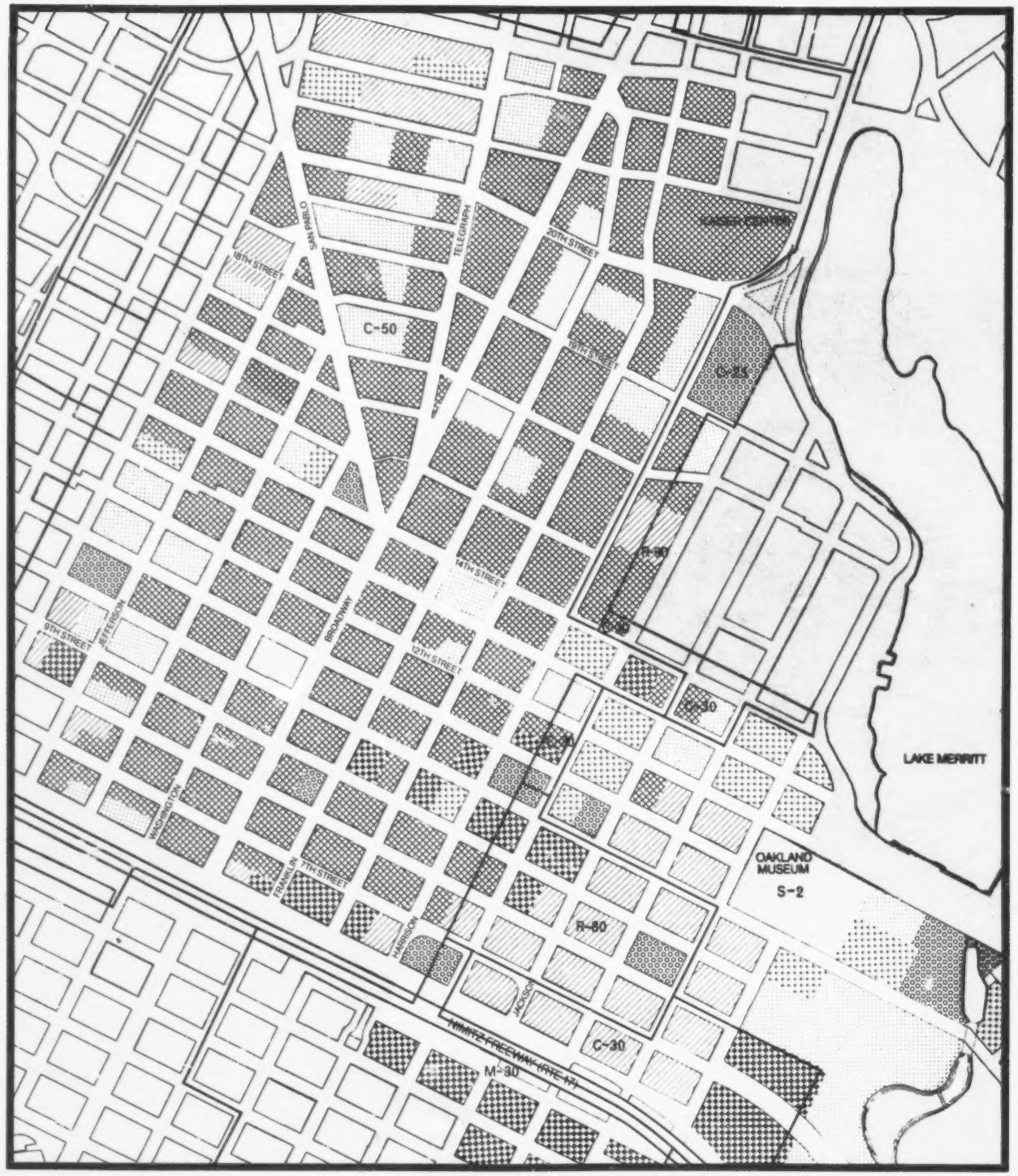
BART's Property Acquisition — BART purchased a total of 37.5 acres of land

OAKLAND STUDY AREA MAPS

32A

DOWNTOWN OAKLAND
12TH ST. • 19TH ST. • LAKE MERRITT STATION AREAS
1965 PRE-BART LAND USE AND ZONING

North
200' 400' 600'



LAND USE

- Residential
- Commercial and Office
- Industrial
- Public and Institutional
- Park Open Space
- Vacant
- Parking

1965 ZONING

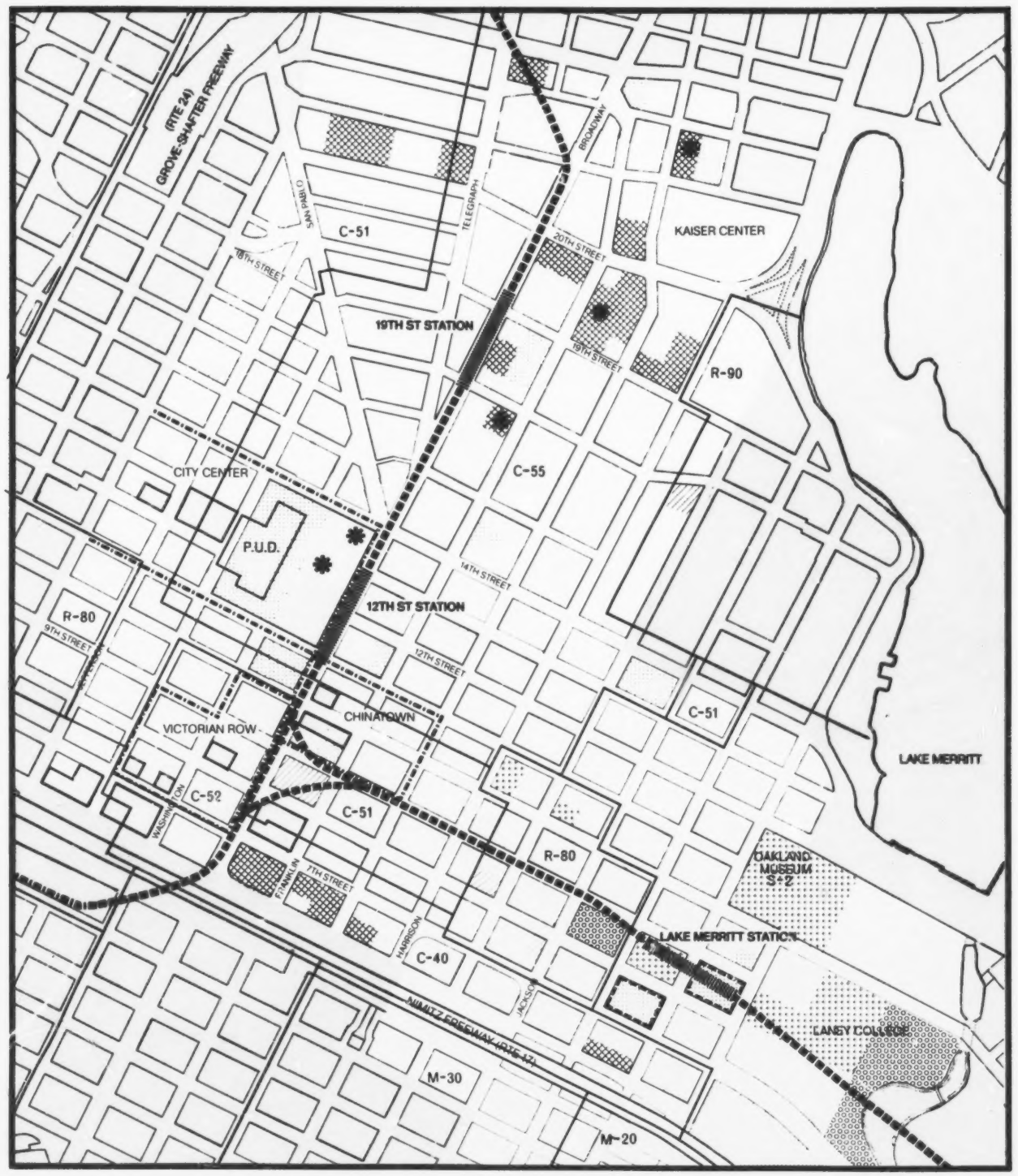
R-80	High Rise Apartment Residential
R-90	Downtown Apartment Residential
C-25	Office Commercial
C-30	District Thoroughfare Commercial
C-50	Central Business Commercial
M-30	General Industrial
S-2	Civic Center

32B

DOWNTOWN OAKLAND
12TH ST. • 19TH ST. • LAKE MERRITT STATION AREAS
1965-77 LAND USE CHANGES AND ZONING

North

200' 400' 600'



LEGEND

- Redevelopment Project
- Major New Building (over 100,000 sq. ft.)
- Demolition

BART

- Station Platform
- Parking
- Subway Line
- Surface Line
- Aerial Line

LAND USE

- Residential
- Commercial and Office
- Public and Institutional
- Park/Open Space
- Vacant
- Parking

1977 ZONING

R-80	High Rise Apartment Residential
R-90	Downtown Apartment Residential
C-40	Community Thoroughfare Commercial
C-51	Central Business Service Commercial
C-55	Central Core Commercial
C-52	Old Oakland Commercial
M-20	Light Industrial
M-30	General Industrial
S-2	Civic Center
P.U.D.	Redevelopment Area

32C

in downtown Oakland, of which 30.3 acres are used for the lines and stations. About one-third (2.5 acres) of the surplus land had been sold by November 1977, and much of the remaining excess land BART owns is being leased for interim uses such as parking. Approximately 400 households were displaced; comparable data on business displacement are not readily available. Of the total acreage, however, 12.3 acres formerly were in commercial or industrial use in comparison with 11.2 acres for the residential properties taken.

Construction Impacts -- Through downtown Oakland BART is in subway and was constructed using a cut-and-cover technique. This was highly disruptive, and retail business activity declined markedly during the period of construction. According to key informants, some marginal businesses closed. Redevelopment, occurring concomitantly with BART construction, also could explain the drop in sales, but because BART allowed an expansion of the City Center Redevelopment Project, BART could be cited once again as an indirect factor in the decline in sales. Building permits for new office construction near BART in Oakland were not issued as frequently during the construction period as during other times, but again, redevelopment could have been a partial cause of this decline.

Environmental Impacts -- Between April 1966 and March 1970, construction impacts around the downtown Oakland stations were similar in nature and intensity to those experienced in downtown San Francisco.[26] Traffic disruption and barrier effects were the major problems for the 19th and 12th Street stations. The Lake Merritt station, however, was not located under a major arterial, and thus construction impacts were not as significant as at the other downtown stations. Oakland police apparently complained to BART officials that construction retaining walls hampered their ability to see into downtown stores and to detect illegal activities possibly occurring inside. However, no significant increase in crime levels was reported during this period.

BART's Transportation Service

Impacts on Travel Behavior -- Travel time comparisons show that BART reduces the average transit work trip to downtown Oakland by 7½ minutes, from 41 minutes in the No-BART Alternative to 33½ minutes -- an 18 percent savings. For the average shopping trip to downtown Oakland, BART offers a potential savings in average transit travel time of 4½ minutes or 12.5 percent in comparison with the NBA.[27]

26. Gruen Associates, Inc., Environmental Impact Case Studies, p. 8.

27. John Blayney Associates/David M. Dornbusch & Co., Inc., Accessibility Mapping.

Daily patronage at the three downtown stations averaged 13,800 during March 1978 with 80 percent of the BART riders using the 12th Street and 19th Street stations. Oakland CBD stations are primarily destination stations, but do serve as origin stations for San Francisco-bound commuters as well. Thus, while 36 percent of all arrivals at Oakland CBD stations are from West Bay stations, only 15 percent of the two-hour AM peak arrivals are from the West Bay. Further confirming this, 66 percent of the two-hour PM peak arrivals at Oakland CBD stations are from West Bay stations.

Eliminating the arrivals at the PM peak period, the origins of travelers to the Oakland CBD stations are 30 percent from the Fremont line (Fruitvale and south), 18 percent from the Richmond line, 17 percent from the Concord line (from Rockridge east), six percent from within the Oakland CBD, and 29 percent from the West Bay -- primarily downtown San Francisco.

Most patrons using BART for morning trips from Oakland CBD stations were white — 73 percent at the 19th Street station and 55 percent at the 12th Street and Lake Merritt stations, according to the 1976 BART Passenger Profile Survey. The percentage of black users was significantly different for the three stations; 13 percent of BART trips to and from 19th Street were made by blacks versus 29 percent at the 12th Street station and 23 percent at Lake Merritt. The proportion of Asian patrons ranged from 7 percent at 19th Street to 17 percent at Lake Merritt. About 36 percent of the BART riders had four or more years of college, and 39 percent had family incomes over $15,000 in 1976.

Among those who commute by BART into downtown Oakland workplaces, 46 percent were male, and nearly 80 percent were white, with seven percent black, seven percent Asian, three percent Spanish, and the remaining three percent other. Furthermore, 46 percent were college graduates, and 67 percent had family incomes of $15,000 or more in 1977. Not surprisingly, the statistics from the 1977 MTC Workplace Survey show that a higher proportion of Oakland in-commuters were white, had higher incomes, and had more education in comparison with those BART users who commuted from Oakland in the morning.

The Oakland urban core stations are well served by connecting bus lines; 17 lines connect with 19th Street, 22 with 12th Street, and four with Lake Merritt. Although the two downtown stations have good connecting bus service, they have poor park-and-ride access because BART does not provide free parking. Limited parking is provided at Lake Merritt (225 spaces). Consequently, walking and buses are the predominant means of access to and from the BART stations for area residents. About 40 percent of trips are by BART travelers who use buses and another 40 percent walk to and from the downtown stations. Most downtown Oakland BART commuters (86 percent) work within an eight minute walk of a station.

BART attracts a significant share of City Center work trips, according to surveys of employees in the Clorox and Wells Fargo office buildings where reportedly 50 percent of the employees use BART to commute to work. The proximity

to the station and direct plaza entrances to the buildings contribute to this high ridership.[28]

BART is not used by many of the elderly residents in downtown Oakland who comprise 30 percent of the resident population within a half mile of the BART station. Although the two downtown Oakland stations have the largest percentages of elderly persons entering the BART system among the 34 stations, the needs of the elderly population are not being met because BART does not go where they want to go and the system is unfamiliar to them and difficult to use. Further, many elderly persons interviewed stated that walking to the BART system poses a problem to them.[29]

Impacts on Workers' Location Decisions — Half of the workers surveyed in downtown Oakland who recently changed jobs viewed BART as an important factor in their job location decision, and 45 percent stated that having a job near a BART station was an important consideration. The fact that BART's influence is slightly less than noted among San Francisco workers is explained in part by the greater availability of lower cost parking in downtown Oakland and easier auto access during commute hours.[30]

Impacts on Office Construction — Approximately two million square feet of major new office space has been built in downtown Oakland since 1965, minor compared to San Francisco, but substantially more than any other area within the BART service area. Total downtown Oakland office space is around five million square feet, compared to 40 million square feet for San Francisco. Roughly 1.5 million square feet was built within 1,500 feet of the 12th or 19th Street stations, and an addition to Kaiser Center, Oakland's largest office complex, was the only new building beyond 1,500 feet. BART was considered a contributing factor in 80 percent or 1.2 million square feet of the new space in the station vicinities, including the Clorox and Wells Fargo buildings located at the 12th Street station, the first completed elements of the BART influenced City Center Redevelopment Project. The Blue Cross and World (Golden West) Savings buildings near the 19th Street station (planned in 1971 and 1968 res-

28. McDonald & Grefe, Inc., The Impact of BART on the Competitive Advantage and Efficiency of Bay Area Business Operators (Berkeley: BART Impact Program Economics and Finance Project Technical Memorandum, August 1977), p. 40.

29. Jefferson Associates, Inc., Three Community Case Studies: Impacts of Bay Area Rapid Transit System on Institutions and Lifestyles (Berkeley: BART Impact Program Institutions and Lifestyles Project Working Note, August 1977), p. 31.

30. See BART Passenger Profile Survey and Peat, Marwick, Mitchell & Co., Travel Data for BART Station Area Case Studies, May 1977.

pectively) might well have located elsewhere if BART had not been built. The two new buildings at City Center, with direct plaza entrances to BART, were built in 1972 and 1975, after anchor tenants were lined up. Planning for the City Center Project began in the mid-sixties, and reached the current conception in the early seventies. The two City Center office buildings have not rented up as quickly as recent San Francisco space, although their rents are lower. (Most rents for class "A" space in new Oakland buildings range between $.75 and $1.00 per square foot per month; in San Francisco equivalent space rents for $1.00 to $1.25.)

The City Center office construction partially resulted in a shift of occupancy from older buildings in downtown Oakland to the new space, with the vacancy rate in several older buildings having increased somewhat. However, this only accounts for about 10 percent of the occupancy leased in new buildings.

Impacts on Employers' Location Decisions — Clorox decided to remain in Oakland as a result of the City Center Project and BART access. The Federal Energy Research and Development Administration — now the Department of Energy — is another major tenant at City Center that chose the location based on BART accessibility for employees and business travel within the region. The decision of Blue Cross to remain in Oakland and develop new space was an employer's decision as well as an office construction decision.

Impacts on Retail Sales — Two of the 10 informants interviewed about sales in downtown Oakland claimed to have noticed some increase attributable to BART, but both mentioned the same store (Capwell's, with its own BART entrance). The Fremont Capwell's, in fact, may be losing sales to the Oakland store. The 1977 Shoppers' Survey gave some indication of a shift to Oakland because of BART: new shoppers tend to be BART riders, (67 percent of the new shoppers, as opposed to 52 percent of the long-term shoppers, rode BART) and about 17 percent of the new shoppers surveyed said that BART was the reason they had begun to patronize downtown Oakland. BART indirectly affected the location of branch offices of Crocker National Bank and Citizens Savings and Loan. Both are located in the Oakland City Center Project, and both might have had a different location without BART due to its influence on the project.

In interviews with Broadway merchants, BART sometimes was cited as a benefit to the downtown, increasing their business volumes and changing the socio-economic mix of downtown shoppers to include more higher income whites who are able to make larger purchases. According to the Institutions and Lifestyles Project's informants, BART has increased sales volumes at 20 percent of the establishments interviewed and the proportion of white shoppers increased from 10 percent to 40 percent. However, most merchants agree that significant changes in downtown Oakland will not occur until the City Center project is complete and the last Grove-Shafter freeway segment opened. (The Grove-Shafter Freeway, from central Contra Costa County -- Walnut Creek and North Oakland, currently stops six blocks short of the City Center site and 10 blocks short of connecting with the Nimitz Freeway. Completion and connection with the Nimitz will allow direct freeway access to City Center from any direction).

Twelfth Street merchants generally were more pessimistic about the future than 19th Street merchants. Some merchants see increasing numbers of suburban shoppers coming into downtown Oakland, while others report a shift in trade toward San Francisco because of BART. However, many believe that the proposed downtown shopping center in the City Center can be competitive with outlying regional centers.

Impacts on Property Acquisition and Occupancy (Speculation) -- Around both the 12th and 19th Street BART stations, speculation in commercial property has occurred, mainly during the time of BART's construction. Several informants mentioned specific transactions that they thought were speculative in character and directly related to BART. So far the speculators have not realized any profits, according to some key informants. No evidence of speculation in residential property was found through analysis of sales transactions, zoning variance requests, homeowners' exemptions, and use changes.

Impact on Office Rents -- Regression analysis indicated that BART may have had a positive effect on commercial rents in downtown Oakland. Between 1973 and 1978, BART had a significant positive effect on upper range rents in downtown Oakland. (Most buildings have a range of rents -- the upper range would be for higher floors, smaller tenants, etc., and the ranges are usually more significant in newer buildings.[31]) The construction of two new City Center buildings adjacent to the 12th Street station may have had an effect on these results.

Impacts on Higher Educational Institutions -- At Laney College, about 540 students, 3.6 percent of total enrollment, use BART to get to school, according to the Institutions and Lifestyles Project's analysis of the 1976 BART Passenger Profile Survey. Many minority students are enrolled at Laney, but an ethnic breakdown for the BART commuters was not available.[32]

Indirect Environmental Effects -- The environmental impacts of downtown Oakland development are small near the 19th Street and Lake Merritt stations. The City Center project near the 12th Street station, while providing significant economic benefits to the area, has had notable social and traffic-related impacts, and planned redevelopment projects (Chinatown and Victorian Row/Old Oakland) will add to the area's impacts. Past and projected effects of the City Center Project include the following:

31. John Blayney Associates/David M. Dornbusch & Co., Inc., Study of BART's Effects on Property Prices and Rents (July 1978).

32. Jefferson Associates, Inc., Impacts of BART on Bay Area Institutions of Higher Education and Their Students, pp. 11-12.

- Demolition of 568 dwelling units, mostly apartments and residential hotels.

- Upon completion, an estimated 20,000 automobiles will be attracted to the City Center Project daily, causing (1) localized adverse air quality impacts along 14th Street and the plazas, and (2) a five decibel noise increase (perceptible) during evening hours.

The Broadway improvement project included 15 blocks (about one mile) and includes the 12th and 19th Street BART stations. Major changes included sidewalk resurfacing (exposed aggregate and tile), addition of concrete street furniture, reconstruction of intersections in decorative concrete, new lighting, and tree planting. This project differs from others related to BART mainly in that it was funded through creation of an assessment district — owners of the buildings with frontage along Broadway paid for the improvements. In addition, BART funds were used for resurfacing 600-800 feet over each station.

BART's Facilities and Operations

Environmental Impacts — As in the case of downtown San Francisco, stations and line segments in downtown Oakland are all in subway. Hence, there is little or no direct environmental impact at the 19th and 12th Street stations.[33] At the Lake Merritt station, it is estimated that from 100 to 150 autos in excess of lot capacity park on the streets around this station, which could bother local residents. Since none of the downtown stations were survey sites in the Environment Project's study, the effect of this parking on the neighborhood is not certain. No other direct impacts are likely at the Lake Merritt station.

The most pressing future impact is likely to be continued and increased problems related to parking and traffic flow around the Lake Merritt station. No new problems are foreseen around the 19th and 12th Street-City Center stations. In fact, the environment around the 12th Street station was improved greatly by the new plaza.

SIMILARITIES AND DIFFERENCES

Downtown San Francisco is considerably more transit-oriented than downtown Oakland, only 25 percent of work trips to downtown San Francisco are by automobile, while 49 percent of work trips to downtown Oakland are by automobile. Parking costs for commuters to downtown San Francisco average $1.35, while in Oakland the average is $.84. Although Oakland is the hub of the BART net-

33. Gruen Associates, Environmental Impact Project Case Studies, p. 8.

work, San Francisco is served by an exceptionally good transit network, even without BART. Both communities revised planning and zoning policies to take advantage of BART, but neither has been totally successful at focusing new development around BART stations. Station area land use changes between 1965 and 1977 are summarized in Table 5, and the square footage difference for new construction is striking.

The San Francisco core downtown stations act almost exclusively as destination stations. Oakland downtown stations, while mostly serving as destinations, also serve as origins for trips to San Francisco. Among characteristics of BART users working in the two downtown areas, those using BART to downtown Oakland tend to be older, have more education, and have higher incomes (see Table 6). While San Francisco office employment may have more clerical and service type functions, the difference is also attributed to the dynamic nature of downtown San Francisco, with the tremendous growth providing more job opportunities for younger, lower income individuals.

BART clearly has had impacts on both the San Francisco and Oakland downtown case study areas. The effects have been both direct and indirect, and include the following impacts:

- BART provided an impetus for public decisions on plans and development regulations, redevelopment, transit improvement projects, and capital improvement programs -- several of which might not have been implemented in the absence of BART (The Market Street Development Project, Muni-Metro and the expanded City Center Project). BART did offer a reason for a "go" decision (and sometimes the financial leverage) for federal grants critically needed to obtain agreement on a specific course of action. In Oakland, redesign and beautification of Broadway and the City Hall Plaza may have occurred in time, but BART provided a focus and partial funding for these actions. The Laney College Project probably was made possible by using BART expenditures as local credits. In San Francisco, BART did not have a substantial direct effect on public redevelopment projects. Some street and transit improvements would have occurred on Market Street without BART, but certainly not to the extent that occurred with BART. The 1968 San Francisco zoning amendments may have been enacted later, but BART certainly is responsible for the density bonuses allowed for station access and station proximity.

- In both downtowns, subways eliminated long-term adverse environmental impacts, although construction caused substantial disruption, noise, and other effects typically associated with major public works projects. BART did mitigate some of the effects, and with technological advances, more could be done today to minimize construction impacts.

- Retail commercial areas in both downtowns may have benefitted from BART. Key informants in both areas believe BART has contributed to increased sales, and the shopper survey showed that new shoppers in both areas rely more heavily on BART than do long-term shoppers.

TABLE 5. URBAN CORE CASE STUDY AREAS:
SUMMARY OF 1965-77 STATION AREA LAND USE CHANGES[a]

New Construction	Downtown San Francisco	Downtown Oakland
Single Family Residential (Units)	—	2
Multi-Family Residential (Units)	460	602
Hotel Accommodations (Rooms)	3,390	60
Office (million square feet)[b]	23.6	1.6
Retail Commercial (Square Feet)	—	65,000
Other Commercial (Acres)[c]	—	2.3
Public Utilities and Transportation (Acres)	3.3	3.7[d]
Institutional and Government (Acres)	—	24.7[e]
Parking (Acres)[f]	11.6	20.8
Recreational Facility (Acres)	1.1	1.4
Demolition — No Redevelopment (Acres)		
Residential	11.8	0.2
Non-Residential	6.6	9.3
Total	18.4	9.5

a. Station area includes all land within 1,500 feet of a BART station.
b. Includes retail space in office buildings and space under construction by January 1978.
c. Includes such commercial uses as service stations and automobile repair shops.
d. Includes BART Headquarters Building.
e. Includes Laney College and the Oakland Museum.
f. Includes only land solely devoted to parking; all other land used for parking is assigned to the principal use category; commercial or office, industrial, etc. that parking serves.

Source: John Blayney Associates

BLANK PAGE

BLANK PAGE

TABLE 6. CHARACTERISTICS OF BART USERS WORKING IN URBAN CORE CASE STUDY AREAS

	Downtown San Francisco[a]	Downtown Oakland[b]
Daily BART Patronage (Trips - March 1978)	49,100	13,800
Income: Percent Earning Over $15,000 in 1976	62.8	66.7
Median Age	34	38
Education: Percent with Four or More Years College	36.3	45.7
Sex: Percent Male	48.2	45.8
Ethnic Status (Percent Distribution)		
— Black	6.5	7.4
— Spanish Heritage	10.6	3.1
— Asian	16.8	7.1

a. MTC zones 421-429
b. MTC zones 142-144

Source: MTC Workplace Survey, 1977

- Because BART offers the greatest gain in accessibility to East Bay residents working in San Francisco, its impacts on residential and workplace patterns have been greatest in these areas.

- BART's direct impact on private sector development decisions has been limited to a small proportion of recent downtown San Francisco development. Indirectly, through its impact on public programs and policies for downtown improvements, BART may have had greater effects on development patterns. BART directly affected a greater proportion of downtown Oakland private development decisions, but the number of development decisions has been much lower in Oakland as a result of lower demand. BART will not, by itself, increase demand for commercial space, but it can affect the location, given demand. Once the Grove-Shafter freeway extension is complete and the City Center Project finally built, Oakland will be in a position more comparable to San Francisco on public infrastructure improvements.

Gains and Losses

Both downtown San Francisco and Oakland gain from BART service more than any other area studied. BART functioned as a catalyst, facilitating construction of public improvements that ensure the viability of the downtowns. In the case of San Francisco, BART helps to forestall the decentralization of business activity that will occur when congestion on the Bay Bridge and major highways reach unacceptable levels. The retail merchants, building owners, and employers of downtown San Francisco probably will be major gainers in the long run. In Oakland, without the BART focus, the City Center Project never might have come about, and the Laney College campus most likely would have been built in a more suburban, less transit-oriented location. Oakland residents and students, particularly minorities, gain from these indirect effects on development and employment in Oakland, as does the downtown Oakland business community. Although Oakland is more central to the BART system than San Francisco, BART has not enabled Oakland to improve its position vis-a-vis San Francisco, which continues to dominate regional commerce.

BART patrons who use the system for commuting from suburban communities to downtown San Francisco and Oakland definitely gain. BART does not serve many San Francisco neighborhoods, so many residents/taxpayers do not have the opportunity to benefit from use of the system, although again they may benefit from increased downtown employment opportunities indirectly attributable to BART. Minorities from both communities particularly benefit from the continued centralization of employment opportunities in the cities where lower cost housing is available.

Merchants on Market Street in San Francisco and on Broadway in Oakland suffered short term negative effects from BART construction. In the long term,

merchants in these locations may be gainers, but particularly in the case of smaller businesses with substantial turnover, they may not be the same individuals who were affected by construction. In downtown Oakland, those households and businesses dislocated by BART property acquisition may have been adversely affected, or they may have actually benefitted from relocation; the outcome varied with individual circumstances.

All in all, the balance sheet for the downtown case study areas shows more gains than losses, suggesting BART has been of net benefit for San Francisco and Oakland.

POLICY IMPLICATIONS

During the first five years of BART's start up and operations, direct impacts on land use have been small in relation to what was anticipated. Indirect impacts, through enabling larger redevelopment projects, prompting major street beautification projects, and influencing local land use policies, have been at least as important, and collectively may exceed BART's direct influence. However, as the attractiveness of BART's service increases with better reliability, shorter headways, and greater train speeds on one hand, and increased highway congestion on the other, the system's impacts on office construction, retail sales, and employers' location decisions should increase. These expectations aside, the BART Impact Program studies of the experience to date suggest that public officials in other cities adopting new fixed rail systems should not expect dramatic, direct land use effects during the first five years of operation.

Rapid rail systems similar to BART will tend to reinforce existing patterns of urbanization. Rail transit is neither a necessary nor sufficient condition for development projects, as market demand in a community must exist for successful development. Supportive public policy can help to shift development into station areas, but zoning restrictions elsewhere in conjunction with development bonuses at stations (such as increased floor area ratios, decreased parking requirements, etc.) are essential.

4. URBAN RESIDENTIAL STUDY AREAS

OVERVIEW

The Mission District of San Francisco, the City of Richmond, and the Rockridge District of Oakland present contrasting pictures of the types of urban areas served by BART. In March 1978, BART usage varied from a high of 3,400 daily patrons at the 24th Street-Mission station and 2,300 at 16th Street-Mission to 2,200 at the Rockridge station and 1,600 at the Richmond station.

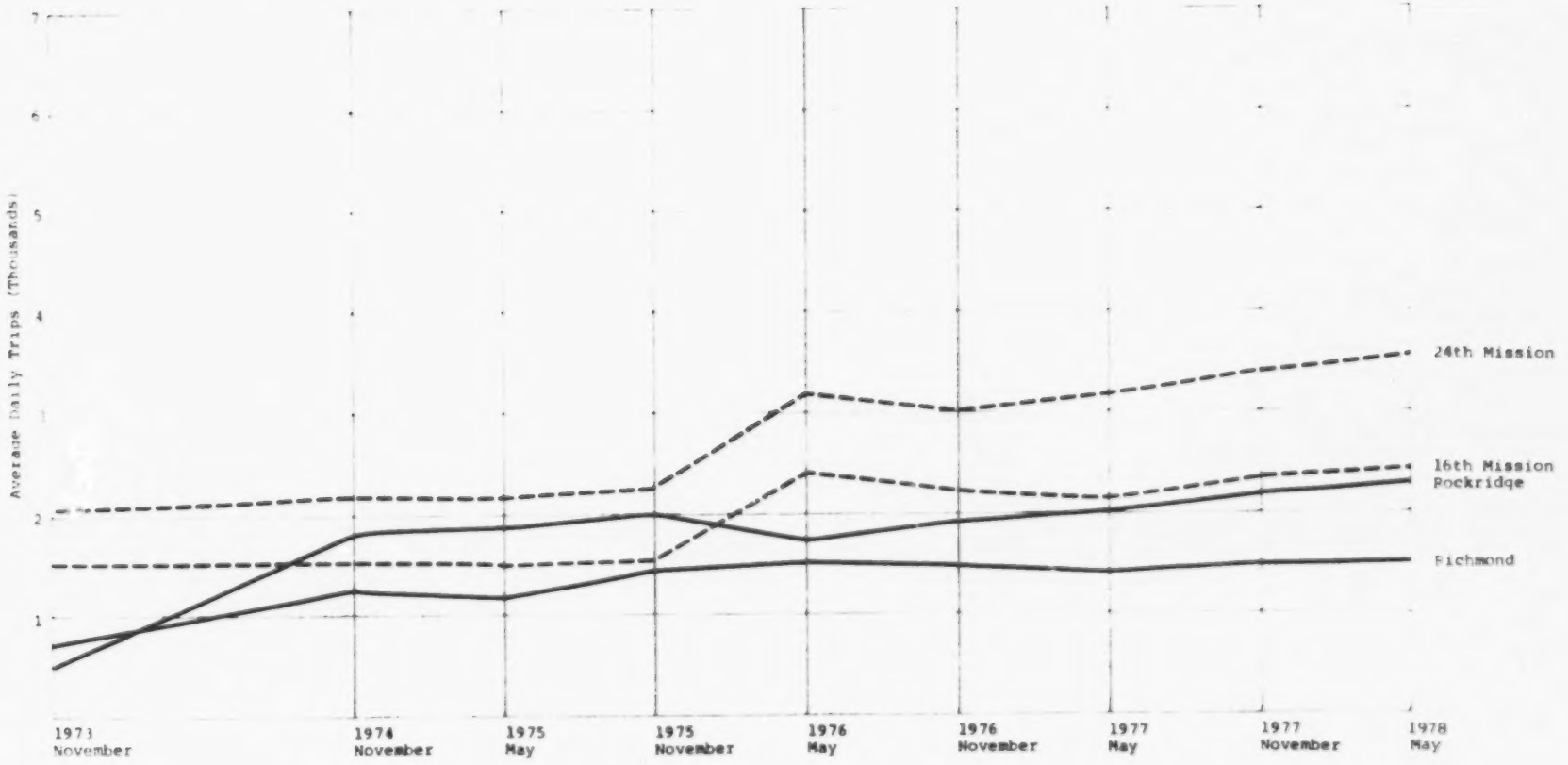
San Francisco's Mission District is a densely populated, mixed commercial and residential area containing a high proportion of pre-1940 housing. Much of the housing is medium to high density rental housing interspersed with attractive, nineteenth century Victorian homes. More than half the 107,000 residents living within one mile of the two BART stations are minorities -- largely Latinos, but also Asians and blacks. Strong community organizations were successful in blocking redevelopment plans for the Mission corridor and initiating rezoning that reduced allowable densities in the BART station areas.

Richmond, an urban sub-center with a large black population, has experienced a substantial decline in its population and economic base downtown since the end of World War II when the Kaiser Shipyards were closed. At the time BART was approved, Richmond's population had dropped from 150,000 in 1945 to 72,000 in 1960, and many businesses had left the downtown. A redevelopment agency organized in the 1950s has keyed many of its planning efforts to BART. Most of the housing in the station area dates from the 1940s and 1950s.

The Rockridge District is typical of a middle income, white neighborhood with older, single family and duplex housing and strip retail and commercial development along College Avenue. Most of the housing was built between 1910 and 1930. Although the proportion of blacks has been increasing since 1970, Rockridge has not undergone the white exodus that occurred in other Oakland neighborhoods, and the neighborhood seems to have reached a point of balance, with no major changes in racial composition in recent years. As in the Mission District, vocal community groups organized a successful campaign to have the area downzoned to eliminate opportunities for higher density, BART-induced residential development.

Population, employment, ethnic, and income characteristics of the urban residential case study areas are summarized in Table 7, while Figure 4 illustrates BART patronage trends in these communities. Ridership has been increasing gradually at the Mission and Rockridge stations, but has remained low at the Richmond station. Introduction of direct Richmond-San Francisco service in fall 1978 should increase Richmond BART usage.

FIGURE 4. MISSION, RICHMOND, AND ROCKRIDGE CASE STUDY AREAS: BART PATRONAGE TRENDS, 1973-78



Source: BART

TABLE 7. URBAN RESIDENTIAL CASE STUDY AREAS: SUMMARY STATISTICS

	Mission District[a]	Richmond[b]	Rockridge[c]
Employment			
1965[d]	13,500	5,200	3,400
1970	12,000	5,400	2,900
1975	12,800	5,500	3,100
Average Annual Growth Rate (Percent)	-.53	.56	-.90
Resident Population			
1960	29,700	18,800	19,600
1970	29,700	16,500	17,600
1975	26,000	13,600	16,400
Average Annual Growth Rate (Percent)	-.9	-2.1	-1.2
1970 Residents' Demographics			
Percent Black	3.7	37.5	33.8
Percent Spanish Surname	37.4	17.4	5.2
Median Family Income (1969 Dollars)	7,200	8,400	11,900
Average Daily BART Patronage (1978)	5,700	1,600	2,200
16th Street Station	2,300		
24th Street Station	3,400		

a. MTC analysis zones 386-387
b. MTC analysis zone 118
c. MTC analysis zone 137
d. The 1965 data for employment may not be accurate.

Source: U.S. Census, Association of Bay Area Governments, BART

MISSION DISTRICT

Setting and Chronology

The Mission District, located in southeast San Francisco, is one of San Francisco's oldest neighborhoods, having been named for an early California mission founded in 1776 and still standing. Just under 40 percent of the population was Spanish surname in 1970, and the median family income of $7,200 (1969) was lower than that in the other urban residential case study areas. In the past several years, the 24th Street-Mission area has been improving commercially and residentially, while the future trend at the 16th Street-Mission area remains uncertain at this time.

In the Mission, BART station construction began in 1967 and did not finish until 1972. The 57 months necessary to complete the two underground stations was much longer than the 22 months for the Richmond surface station and the 25 months to build the Rockridge elevated station.

Major milestones in the Mission District, summarized in Table 8, include station construction, the aborted redevelopment plans, major rezonings, and the closure of several major Mission District retail businesses.

BART's Organization, Planning and Publicity

Coordination: Station and Route Location, Planning and Design -- Community groups were not involved in the early planning stages. The expectations and fears of BART's impacts on the Mission District increased as subsequent studies in the mid-1960s described BART's potential effects in greater detail. For the most part, coordination with BART was conducted by the same individuals in the City government active on downtown planning questions.[34]

Impacts on Planning and Zoning -- In response to community pressure and planning studies, the City acted in 1972 to reduce the height limits around the two BART stations from 240 feet to 105 feet at the 16th Street station and from 160 feet to 100 feet at the 24th Street station. (See Mission District pre- and post-BART maps.) In July 1975, several blocks parallel to Mission Street in the 24th Street station area and one block in the 16th Street station area were rezoned from Community Business (C-2) to Low-Medium Density Residential (R-3), reflecting current usage.

In 1974, the Mission Housing Development Corporation, a community-based organization, further recommended that the High Density Residential (R-4) zone in the Mission station areas be downzoned to Low-Medium Density Residential (R-3), except for several blocks around the 16th Street BART station, and that the height and bulk limits be maintained with bulk variances granted only around 16th and Mission. These recommendations conform to the policies of the 1974 Mission Plan proposing to restrict new development to the 16th and Mission

34. Booz, Allen & Hamilton, Inc., The Impact of BART on Land Use and Urban Development Policy, p. 25.

TABLE 8. MAJOR MILESTONES IN THE MISSION DISTRICT CASE STUDY AREA, 1962-78.

BART Planning, Construction and Operation	Year	Public Action	Major Station Area Land Use Changes
Present station location adopted; BART bond issue approved	1962		
	1964		
	1966	General Neighborhood Renewal Plan Rapid Transit Corridor Study initiated; Mission Street Survey completed; Mission Street Urban Design Study completed	
Station construction begins		Mission Street Redevelopment Project opposed by citizens	
	1968	Mission Coalition Organization formed; Rezoning in station area; Mission Transit Station Areas Design Study and Beautification Project initiated	
	1970		Mission Street Beautification Project construction begins
Stations completed		Citywide Urban Design Study completed	Mission Street Beautification Project completed
	1972	Height limits adopted as part of rezoning; Transportation element adopted	
Interim service begins		Northeast Industrial Zone Study completed	
Transbay service begins	1974	Plan for the Inner Mission completed	
		Commercial to residential zoning change in 24th Street station vicinity	Sears closes; Redlicks Furniture closes
	1976		
Night service begins		16th Street Study completed	Employment Development Department moves into former Sears building
Saturday service begins	1978		

Street area. The Plan also recommended maintaining the existing character of the Mission by rezoning the 16th Street Heavy Commercial (C-M) Zone to Community Business/High Density Residential (C-2/R-4). To date, these rezonings have not been enacted by the City, but further studies have been supportive and at the least, development restrictions to preserve the character of the inner Mission can be expected. As a consequence, opportunities for high density, transit-oriented development will be quite limited.

Impacts on Redevelopment Projects — In 1966 the proposed $90 million redevelopment project to which BART would have contributed $4 million of the required $30 million in local matching funds was strongly opposed by Mission residents, and later abandoned (1967).

Impacts on Local Government Expenditures -- The Mission Street beautification project included $2.5 million for BART-related improvements. BART had no other direct impact on San Francisco's expenditures for capital improvements in the Mission District.[35]

BART's Construction Process

BART's Property Acquisition -- Because the line is in a subway through the Mission District, BART only had to acquire land for the station entrances -- a total take of 0.8 acres. Eight small businesses were affected, and several housing units were acquired in buildings with ground floor commercial use.

Construction Impacts — Cut-and-cover construction disrupted retail sales activity of many merchants on Mission Street between 16th and 24th streets. Concurrent with BART construction, the retail vitality of Mission Street was declining, and several stores went out of business. In some cases, sales were declining before BART construction began, but most of the retailers interviewed attributed losses to BART.[36]

Environmental Impacts -- Construction impacts at these two stations (16th Street and 24th Street) were similar to those in downtown San Francisco and Oakland. During the five-year construction period, undoubtedly the most serious impact was vehicular and pedestrian disruption. The 1972 Special Sites Survey conducted by the University of California indicated that parking, getting to and from work/stores/schools, and going places on foot were negatively affected by BART. To minimize impact, a traffic management plan was implemented which included relocating bus service to a parallel street. The traffic disruption probably had some negative effects on local businesses in the area.

35. Ibid., p. 70.

36. Gruen Associates, Inc., Environmental Impact Project Case Studies, p. 3.

MISSION DISTRICT STUDY AREA MAPS

48A

BLANK PAGE

BLANK PAGE

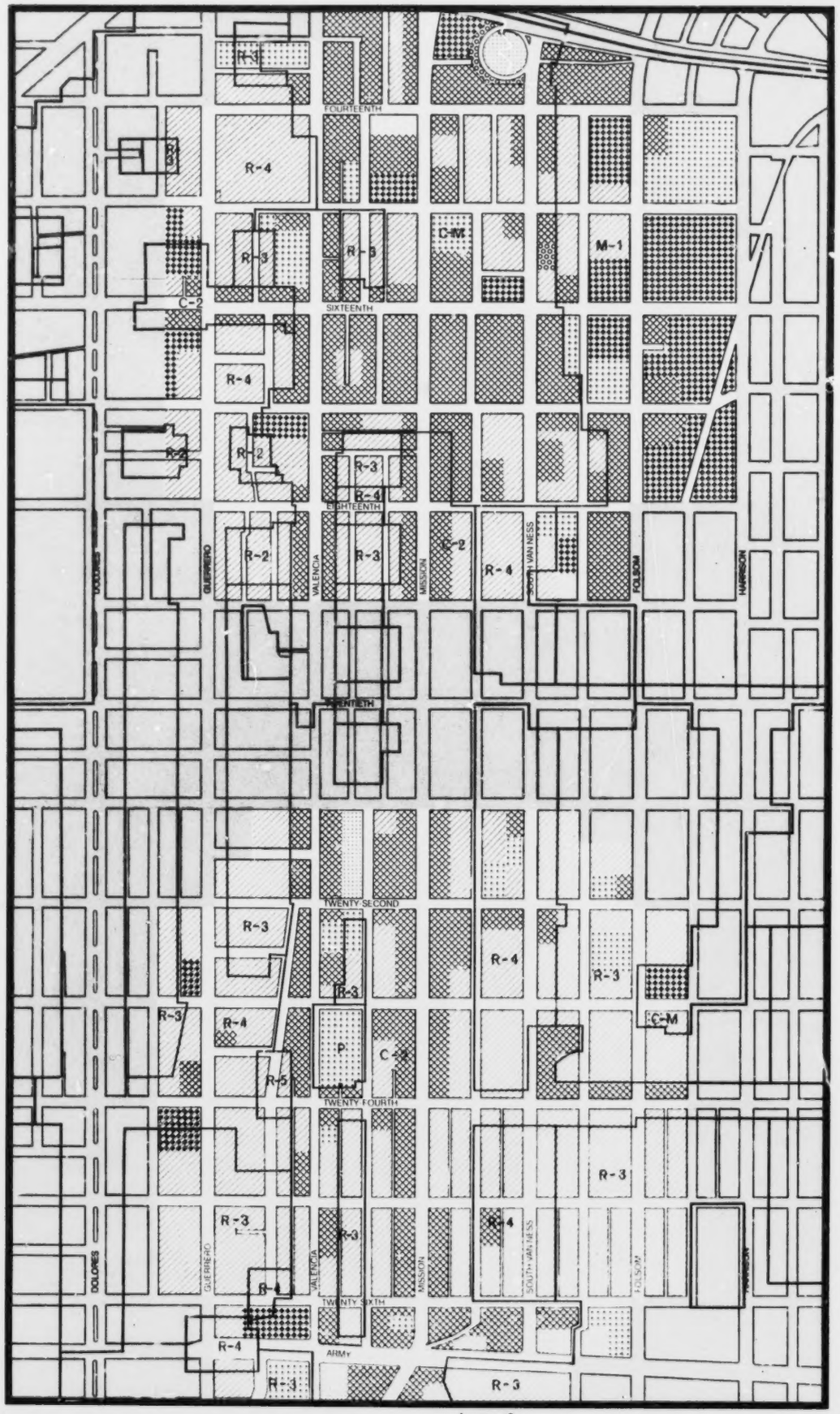
TABLE OF CONTENTS

		Page	
SUMMARY		i	1/B2
	Objectives	i	1/B2
	Methodology	j	1/B2
	Findings	iii	1/B4
	Conclusions	viii	1/B9
	Policy Implications	ix	1/B10
1.	INTRODUCTION	1	1/B13
	Organization of Report	2	1/B14
2.	FRAMEWORK FOR ANALYSIS	3	1/C1
	Objectives	3	1/C1
	The Impact Process: Theoretical Perspective	4	1/C2
	Case Study Areas	6	1/C5
	Data Collection, Analysis, and Interpretation	9	1/C8
	Limitations	15	1/D1
3.	URBAN CORE STUDY AREAS	16	1/D2
	Overview	16	1/D2
	Downtown San Francisco	18	1/D5
	Downtown Oakland	29	1/E9
	Similarities and Differences	38	1/F10
	Policy Implications	42	1/G4
4.	URBAN RESIDENTIAL STUDY AREAS	43	1/G5
	Overview	43	1/G5
	Mission District	46	1/G9
	Richmond	52	2/A9
	Rockridge	60	2/B7
	Similarities and Differences	65	2/C2
	Policy Implications	70	2/C9
5.	SUBURBAN STUDY AREAS	71	2/C10
	Overview	71	2/C10
	Walnut Creek	71	2/C10
	Fremont	82	2/D13
	Similarities and Differences	89	2/E11
	Policy Implications	93	2/F4
BIBLIOGRAPHY		95	2/F6
PAPTICIPATING FIRMS		102	2/F13
APPENDIX A. KEY INFORMANTS INTERVIEWED		A-1	2/F14

MISSION DISTRICT
16TH ST. • 24TH ST. STATION AREAS
1965 PRE-BART LAND USE AND ZONING

North

200' 400' 600'



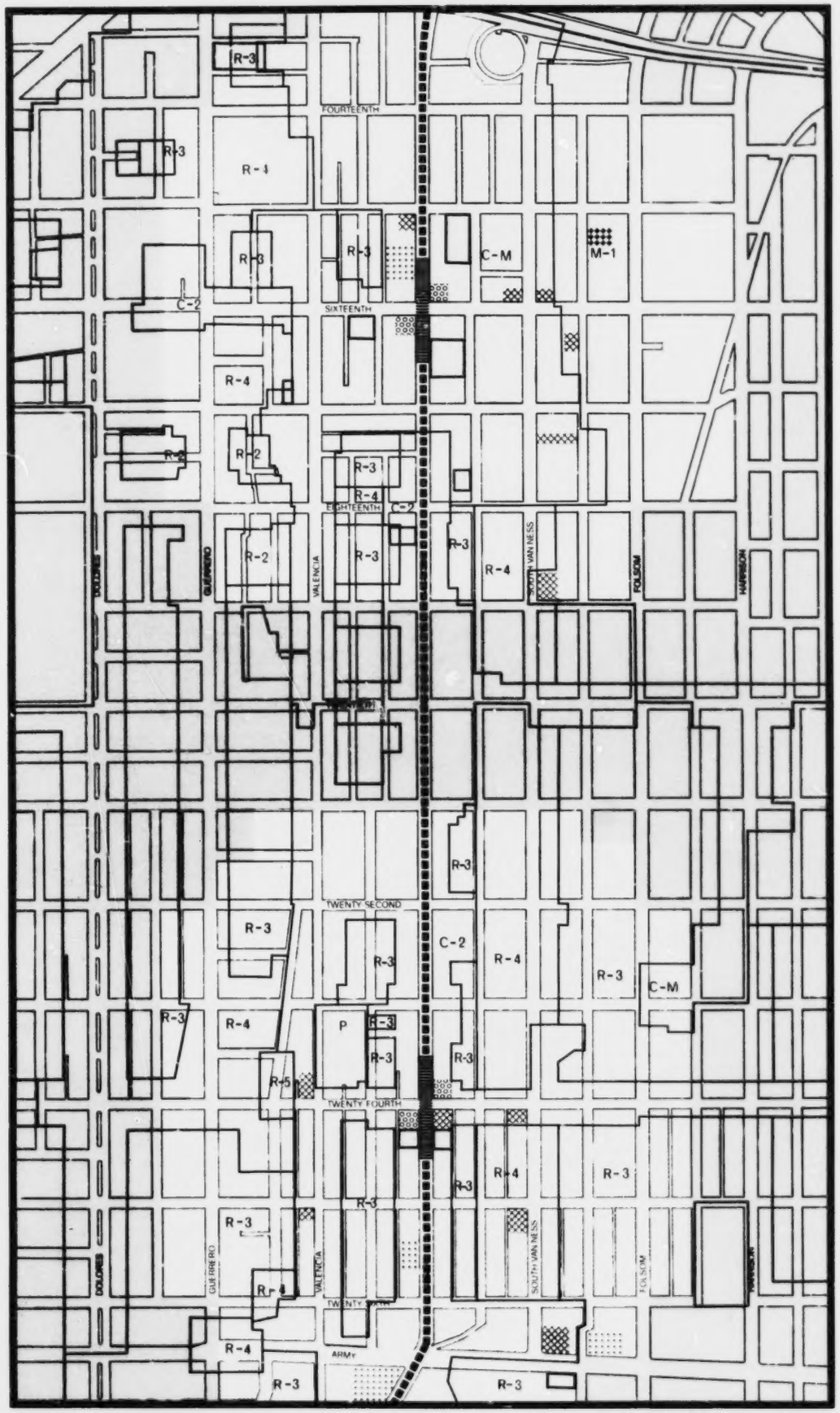
LAND USE

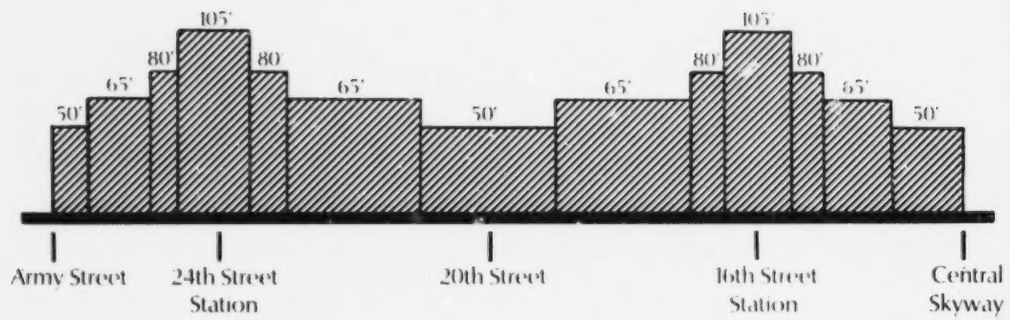
- Residential
- Commercial and Office
- Industrial
- Public and Institutional
- Park Open Space
- Vacant
- Parking

1965 ZONING

R-1	Single Family Residential
R-2	Two Family Residential
R-3	Low-Medium Density Residential
R-4	High Density Residential
R-5	Highest Density Residential
C-2	Community Business
C-M	Heavy Commercial
P	Public Use
M-1	Light Industrial

48B





1977 MISSION DISTRICT HEIGHT LIMITS
Mission Street Section Vertical Scale 1" = 100'

MISSION DISTRICT
16TH ST. • 24TH ST. STATION AREAS
1965-77 LAND USE CHANGES AND ZONING

BART
- Station Platform
- Parking
- Subway Line
- Surface Line
- Aerial Line

LAND USE
- Residential
- Commercial and Office
- Industrial
- Public and Institutional
- Park Open Space
- Parking
- Demolition-no new use

1977 ZONING

R-1	Single Family Residential
R-2	Two Family Residential
R-3	Low-Medium Density Residential
R-4	High Density Residential
R-5	Highest Density Residential
C-2	Community Business
C-M	Heavy Commercial
P	Public Use
M-1	Light Industrial

48-C

BART's Transportation Service

Impacts on Travel Behavior -- BART offers Mission District residents a far greater travel time advantage for transit work trips than residents of the two other urban residential study areas -- a five minute savings reducing the average work trip from 32 minutes under the NBA assumptions to 27 minutes -- a 16 percent difference. However, for the 60 percent of Mission residents traveling to downtown San Francisco, the average work trip is shorter and time savings less significant. Off-peak travelers also stand to benefit from BART, with a three minute average trip time savings (9 percent).[37]

With daily patronage at the two Mission stations at 5,700 in March 1978, including morning trips into the Mission and trips by some persons living beyond one mile from the station, it is clear that a small percentage of the population living within a one mile radius of the stations (107,000 in 1970) is using BART. The Mission District was already well served by Muni service to downtown San Francisco, and the access BART provides to other areas is not of great importance to Mission residents. Latinos accounted for an estimated 40 percent of the population (based on proportion within one-half mile) and for 23 percent of the BART users, according to the 1976 BART Passenger Profile Survey. Approximately 30 percent of the users had four or more years of college and 30 percent had family incomes of $15,000 or more. Most persons leaving the area (60 percent) were making work-oriented trips, although 14 percent were attending to personal business and 10 percent were on the way to school.

During the morning peak period more than twice as many persons leave on BART as travel to the 16th Street station, while at the 24th Street station, five times as many leave the Mission as come in. Of travelers leaving the Mission, 60 percent are going to downtown San Francisco and 23 percent to the East Bay.

Each Mission station is served by nine connecting bus lines, some of which serve both stations, and also parallel BART service into downtown San Francisco. Although these stations have adequate bus service, they have poor park-and-ride access because BART does not provide free parking, and little parking is available on nearby streets. Almost two-thirds (64 percent) of all riders walk to and from the BART stations; about 17 percent of the trips are made by bus, and about 11 percent are dropped off.

Anyone living within the inner Mission is within a three minute drive of a BART station, and with nine connecting Muni lines in the Mission, taking a bus to BART -- considering riding time alone -- is probably not much more. In fact, about half of those driving to BART in the Mission report auto access times under five minutes — 56 percent for the 24th and Mission Street station and 45 percent for the 16th and Mission Street station.

37. John Blayney Associates/David M. Dornbusch & Co., Inc., Accessibility Mapping.

Impacts on Workers' Location Decisions — This impact was not specifically studied in the Mission District, but as many Mission District workers are San Francisco residents, BART cannot substantially improve upon the commute service provided by the Muni. Therefore, BART would not be expected to be an important influence on workers' location decisions in the Mission.

Impacts on Office Construction — Since the 1960s, only one major office building has been built near a Mission District BART station. This lack of development was primarily a result of lack of demand, but partially a result of zoning changes as well. Between 1970 and 1976, there were three office rehabilitations of $100,000 or more. Some renovation of older buildings occurred (El Dorado, Redstone, Los Portales, and Mission Medical Center Building), and retail commercial buildings were converted to office use (the remodeling of an old Sears store by the California Employment Development Department), but newer tenants, employees and customers are not notably different from the older users. Thus BART's impact on commercial and office development in the Mission is minimal.[38]

Impacts on Employers' Location Decisions — No major employers moving into the Mission have been influenced by BART. An office of the California Employment Development Department recently moved into the old Sears building, with the primary objective of providing better service to Mission residents.

Impacts on Retail Sales — Business people and developers in the Mission District, including minorities and others, are concerned about the loss of large retailers, such as Lachman's, Redlicks, and Sears. To prevent the commercial area from becoming degraded, informants believe that an effort must be made to attract new shops and businesses. Specialization in Latino food, merchandise, and arts is one scheme being considered to attract people to the area for shopping. BART is viewed as a stabilizing influence with the potential for extending the market of consumers to be attracted to the Mission. Although BART has increased the retail sales of one merchant interviewed, no major retailers have moved into the area, and in general the disruption caused by construction appears to have outweighed any current attraction to the area that BART may induce.

Impacts on Housing Construction and Rehabilitation — No significant residential development has occurred within 1,500 feet of either Mission BART station. One apartment building and two mixed use buildings (residential over commercial) were constructed within one-half mile of the stations, but these were unrelated to BART. Rehabilitation activity around the BART stations was one-third to one-sixth lower than in neighborhoods one-half to one mile away, but this can be attributed to lower proportions of owner occupants and mixed residential-commercial uses in the station areas, factors that discourage rehabilitation to a greater degree than in the Eureka and Noe Valley neighborhoods to the

38. John Blayney Associates/David M. Dornbusch & Co., Inc., Study of Workers' Location Decisions, pp. 14-25.

west where there has been substantial renovation activity. According to a 1973 survey, vacancy rates were higher in station area census tracts than in non-station area census tracts, suggesting that the most desirable places to live in the inner Mission (and hence the primary places for seeking a dwelling to rehabilitate) were not in immediate proximity to BART. In the same vein, based on 1970 census data, rents were lower, incomes were lower, and minority representation was higher in station area tracts than in non-station area tracts elsewhere in the Mission.

Within walking distance of the BART stations, scattered lots are available for mixed residential and commercial development, but according to informants, until market demand permits higher rentals, new construction will be minimal.

The basic pattern of single family residences and small multi-family units — mixed residential and commercial development, but according to informants, small industries in the Mission have not been changed by the coming of BART.

The basic pattern of single family residences and small multi-family units — sometimes owned but more frequently rented -- and small businesses and small industries in the Mission have not been changed by the coming of BART.[39]

Impacts on Households' Location Decisions — BART is not a major determinant in many households' decisions to locate in the Mission; only 14 percent of a 1977 sample of movers living within a 10 minute walk of the stations and less than five percent of those living further away indicated that BART was a major consideration in their location choice. These proportions contrast with the 30 percent and 32 percent of Walnut Creek households within and beyond 10 minutes who considered BART important in their residence location decisions. This difference is not particularly surprising since the Muni provides an alternative mode of public transportation for most Mission households in contrast to Walnut Creek where there is no good transit alternative.

BART's effects on San Francisco employment may have raised the overall level of demand for housing in San Francisco, and escalating housing prices have brought higher income households into the Mission, attracted by somewhat lower prices and Victorian homes, but these people are not moving in mainly because of BART, although its service clearly is an amenity valued by local residents commuting to work in San Francisco and the East Bay.

Impacts on Property Acquisition and Occupancy (Speculation) — In the two station areas some residential and commercial speculation has occurred, but except for the period before BART began service, it cannot be attributed directly to BART. Speculative activity has been increasing, but is not widespread. Profits from speculation in the 1960s and early 1970s have not been realized, according to key informant interviews.

39. John Blayney Associates/David M. Dornbusch & Co., Inc., Study of the Housing Industry (April 1978).

Impacts on Property Prices and Rents -- BART's effect on residential property prices in the vicinity of the 16th Street station was not determined, but around the 24th Street station some effect on both residential and commercial property values in the early period before service began was apparent. While there was no discernible effect on residential rents, BART had a slight positive effect on residential sales prices during the construction period. Since service began, this positive effect seems to have abated. Commercial prices near the 24th Street station escalated strongly from before the pre-construction to the construction time period, but this apparent BART effect seems to have disappeared as merchants' expectations of a BART-related market have not been realized.

Indirect Environmental Effects — Since there has been minimal BART-related development in the Mission District, there have been no indirect environmental effects.

BART's Facilities and Operations

Environmental Impacts — As with other subway portions of the BART system, impacts along Mission Street and at the two stations are minimal. BART-related vibration levels were measured and found to be of the same magnitude as those of passing vehicular traffic. Because there is no station parking provided, BART may have affected demand for on-street spaces, but this was not studied.

The BART subway stations open into plazas at 16th and 24th streets, consisting of two small areas located on diagonally opposite corners of the intersection. The central element of each area is a large BART station opening. While the plazas function well for BART purposes and provide some space for community functions, the design could have been improved with consideration of the community's ceremonial and open space needs.

Sidewalks for the first block on each side of the BART stations were widened, trees were planted, and furniture was installed. Although initially attractive, the sidewalk improvements are not well maintained (litter accumulates and trees are not well cared for), street furnishings crowd the narrow sidewalk, and furniture has been broken without repair. Negotiations are underway between community representatives and the City for more effective maintenance.

RICHMOND

Setting and Chronology

The City of Richmond is a medium size city located 15 miles north of Oakland on a Peninsula separating San Francisco and San Pablo bays. After a World War II boom in which Richmond's population grew from 23,000 in 1940 to 120,000 by 1945, the closing of the shipyards and relocation of auto assembly plants caused the population to fall to 100,000 in 1950 and 72,000 in 1960, causing

TABLE 9. MAJOR MILESTONES IN THE RICHMOND CASE STUDY AREA, 1962-78.

BART Planning, Construction and Operation	Year	Public Action	Major Station Area Land Use Changes
4th Street station location proposed; BART bond issue approved	1962	Chamber of Commerce Downtown Development Plan proposed	
16th Street station location adopted	1964	General Plan adopted; Downtown Urban Renewal Plan proposed	
	1966	Policy Plan for the Iron Triangle proposed and adopted; Downtown Urban Renewal Plan adopted Station Design study initiated; General Plan amended to incorporate BART station area and Iron Triangle plans	Social Security Building planned (1967-73); Demolition begins within redevelopment area
	1968		
Station construction begins	1970	Nevin Center Project Plan completed Redevelopment Area extended to BART station	Hilltop Mall planned
Station completed	1972		
Interim service begins		Downtown Urban Renewal Plan amended to include station area	Social Security Building construction begins
	1974	Land adjacent to BART line rezoned from industrial to commercial and residential	
Transbay service begins (Transfer required)			Hilltop Mall construction begins; Social Security Building completed; Kaiser Hospital planned
	1976		Pedestrian mall (Kevin Street) completed; Hilltop Mall opens Amtrak station construction begun and completed
Night service begins			
Saturday service begins	1978		Kaiser Hospital construction begins

Richmond to suffer many of the problems associated with declining urban centers. Since that time, Richmond's population increased somewhat as suburban growth areas were annexed, but then declined during the 1970s.

Richmond has a council-manager form of government, with a nine-member city council elected at large. The City has created a semi-autonomous Housing Authority and Redevelopment Agency.

Station area population has declined substantially, median family income was only $8,400 in 1969, and the majority of station area population was black (37 percent) or Spanish (17 percent) in 1970 (see Table 7). The downtown core of Richmond has been in decline for some time, and the Redevelopment Agency has been active in the station area, but success at attracting new uses to the area has been limited to date. Richmond was the scene of riots in the late 1960s, and this hastened white flight and decreased business confidence in the city. Downtown Richmond, which includes the BART station, has poor freeway access, was constrained by railroad tracks (the iron triangle), and recent commercial development has clustered at Hilltop, a suburban part of Richmond with direct freeway access.

Early BART planning and the Composite Report called for the Richmond station (terminal on the Richmond line) to be located to the west of the downtown area (4th Street). In 1965 BART and the City agreed to a new location several blocks east, but still nearby the center of town, in order to be located between two possible redevelopment areas and to use existing Southern Pacific Railroad right of way. Construction of the surface station commenced in 1970 and was completed in early 1972. In 1977 an AMTRAK station was built adjoining the BART station to facilitate transfers.

The chronology of major milestones (Table 9) indicates the variety of planning and redevelopment studies done for downtown Richmond. The redevelopment area adjoining the station currently consists of 24 blocks (108 acres).

BART's Organization, Planning, and Publicity

Coordination: Station and Route Location, Planning and Design — Negotiations on station location, 4th Street versus 16th Street, and the alignment decision resulted in decisions judged beneficial to Richmond. Bringing the station into the downtown provided a vehicle for redevelopment, while BART-related capital improvements and grade separations reduced the impact of the existing railroad right of way at 16th Street as a community barrier.

The City created a liaison position in the Public Works Department and as a consequence, a number of special studies, such as freeway access to the Richmond-San Rafael Bridge, were completed. All City departments, not just the

BART liaison person, were involved in BART-related issues and decision making.[40]

No community groups were created in response to BART, nor did existing groups actively encourage the City to take advantage of BART.

Impacts on Planning and Zoning -- Several planning studies were conducted, but few changes in the zoning map or development review procedures were initiated. The 1977 General Plan largely restated the 1966 Plan, proposing higher residential density and slightly expanding the general commercial downtown area. The Iron Triangle Policy Plan, adopted in 1967 to promote intensive mixed use in the station area, served as the basis for carrying out the Model Cities Program from 1965 to 1975 and still guides Richmond's capital improvement programming. Initial proposals for a second downtown commercial/residential project, the Nevin Center Project to be located east of the BART station, gained little support and subsequently were abandoned.

In 1968 an area along the railroad/BART line was rezoned industrial, and residential and commercial zones were expanded into the former industrial zone south of the station. An overlay district was added to contain small residential, commercial and industrial zones within the station area, allowing for variation in development consistent with the General Plan (for example, reduction or increase of permitted residential density, change of height restrictions, and addition of off-street parking requirements). These changes are illustrated on the pre- and post-BART maps.

Impacts on Redevelopment Projects -- BART enabled the City to finance an expanded $21 million downtown redevelopment project adjacent to the station. However, with opening of the competing Hilltop Mall Shopping Center, the Redevelopment Agency abandoned its early efforts to create a downtown shopping center and now promotes the project as a service center. The new Social Security building, the Amtrak station, and the Kaiser Foundation Medical Clinic all are key elements in the current plan. A six-block pedestrian mall and beautification project, Nevin Mall, also was constructed linking the BART station with downtown.

Impacts on Local Government Expenditures -- All in all, Richmond realized a minimum of $3-$4 million in non-cash credits and savings as a result of BART's construction. These included $2 million in credits toward obtaining Federal

40. Booz, Allen & Hamilton, Inc., The Impacts of BART on Governmental Structure, Organization, and Operations Policies, pp. 16-17.

development funds and $1.6 million in grade separation costs paid by BART.

Capital improvements related to BART include the grade separation projects, Nevin Mall construction, 33rd Street pedestrian overcrossing, the 19th Street widening, and the downtown redevelopment project.[41]

BART's Construction Process

BART's Property Acquisition — In Richmond, BART acquired a total of 68.3 acres, 93 percent of which (63.3 acres) is used for the system itself. The station is on the site of a former Southern Pacific Railroad station. Residential displacement totalled 170 units, and commercial, industrial, and railroad properties also were acquired. Three acres of surplus land have been sold, leaving two acres still under BART ownership.

Construction Impacts — According to informants, patronage at downtown stores declined during construction, but this mainly was attributed to redevelopment, not BART.

Environmental Impacts — During the five-year construction period (1967 to 1972), impacts at this BART station were minimal due to its location immediately adjacent to land cleared for redevelopment and a railroad. Major street improvements at the same time (in response to redevelopment and BART) undoubtedly had an effect on the area's traffic circulation.

BART's Transportation Service

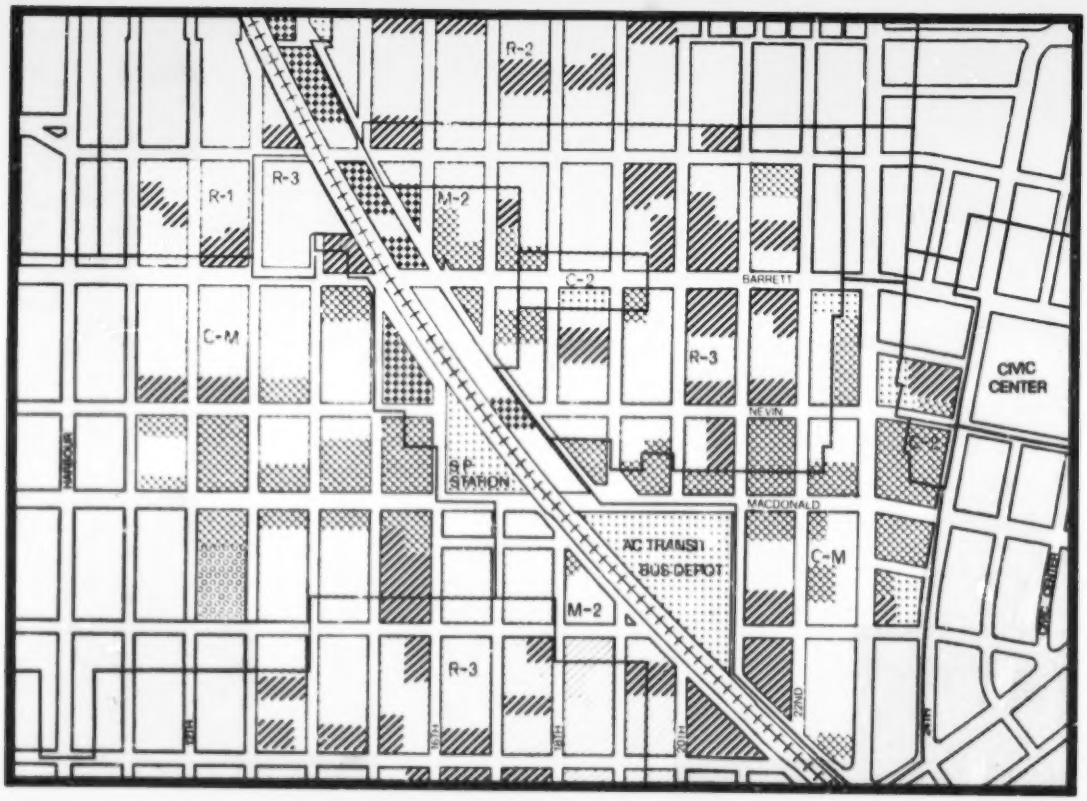
Impacts on Travel Behavior — BART's impact on work trip travel times is negligible according to BART/NBA comparisons. BART travel time saving is less than one minute. For off-peak travel, the NBA offers superior transit service to Richmond residents, with average shopping trips to downtown Oakland and other East Bay shopping areas, for example, taking four minutes longer and being more expensive on BART.[42] It should be noted that direct Richmond-San Francisco service is only slated to begin in fall 1978, and the necessity to transfer for such trips to date has clearly affected station patronage.

41. Booz, Allen & Hamilton, Inc., The Impacts of BART on Land Use and Use and Development Policy, p. 49.

42. John Blayney Associates/David M. Dornbusch & Co., Inc., Accessibility Mapping, p. 12.

RICHMOND STUDY AREA MAPS

56-A



RICHMOND STATION AREA
1965 PRE-BART LAND USE AND ZONING

North

200' 400' 600'

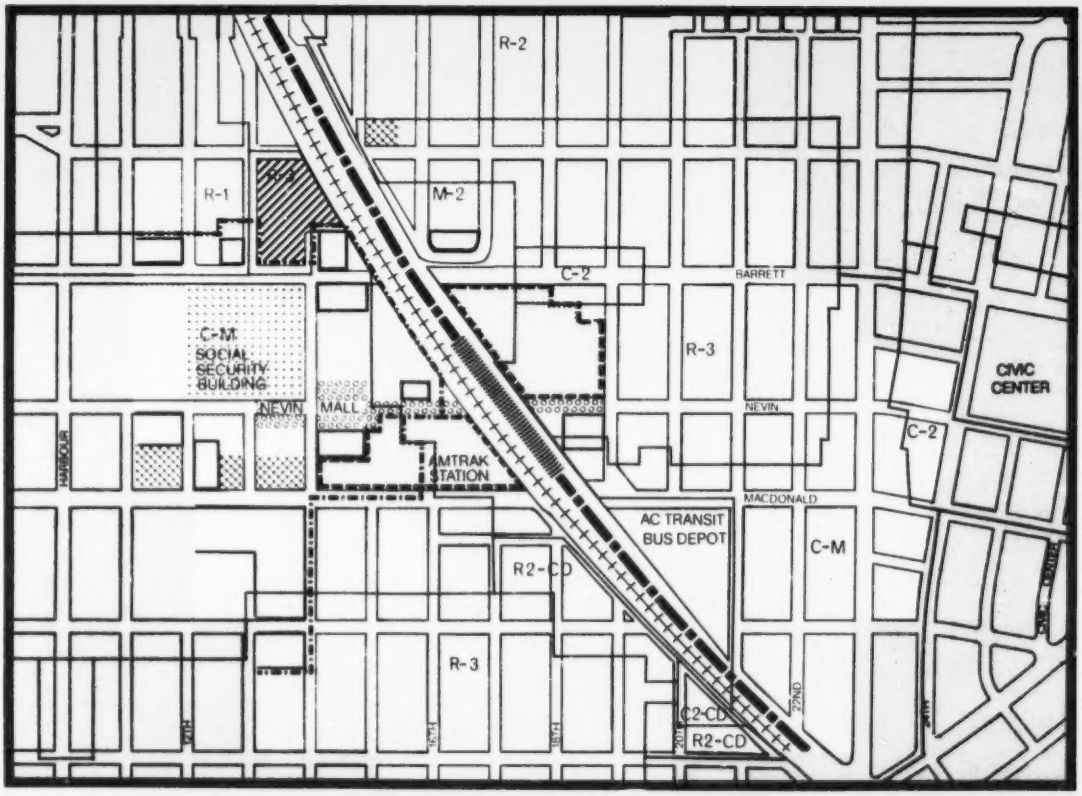
LAND USE

- Single Family Residential
- Multi-Family Residential
- Commercial and Office
- Industrial
- Public and Institutional
- Park Open Space
- Vacant
- Parking

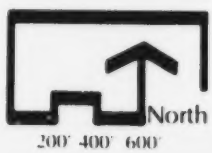
1965 ZONING

R-1	Single Family Residential
R-2	Multi-Family Residential
R-3	High Density Residential
C-2	General Commercial
C-M	Central Business
M-2	Light Industry

56-B



RICHMOND STATION AREA
1965-77 LAND USE CHANGES AND ZONING



BART
- Station Platform
- Parking
- Subway Line
- Surface Line
- Aerial Line

LAND USE

- Multi-Family Residential
- Commercial and Office
- Public and Institutional
- Park Open Space
- Parking
- Demolition (no new use)
- Redevelopment Project
- Southern Pacific RR

1977 ZONING

R-1	Single Family Residential
R-2	Multi-Family Residential
R-3	High Density Residential
C-2	General Commercial
C-M	Central Business
M-2	Light Industry
R2-CD	Multi-Family Controlled Development
C2-CD	General Commercial Controlled Development

56-C

At the Richmond station current patronage is quite low, averaging 1,600 trips a day in March 1978. Forty-three percent of the BART riders were minorities: 32 percent black, 7 percent Latino, and 4 percent Asian. The proportion of travelers leaving for work from the Richmond station was lower and the proportion leaving for school higher than at stations in other urban residential case study areas — 56 percent and 25 percent respectively. The proportion of female users was unusually high — 59 percent. During the morning peak about as many people commuted into Richmond as out. Coming in, 84 percent are from the East Bay and 4 percent from downtown San Francisco.

Most Richmond residents can drive to BART within nine minutes, while those living in El Sobrante, Pinole, and Hercules are 15-18 minutes away. For most riders coming from north of San Pablo, the I-80 freeway access to the El Cerrito Del Norte BART station is faster than arterial street access to the Richmond station. In comparison to other end-of-the-line stations, Richmond has the greatest proportion of commuters reporting auto access times of five minutes or less — 45 percent versus 22 percent for Daly City, 33 percent for Concord, and 39 percent for Fremont. Access modes to the Richmond station include auto — 33 percent, walking — 26 percent, bus — 24 percent, and 17 percent are dropped off. Four bus routes serve the Richmond station.

Ridership is low at the Richmond station mainly because BART does not offer Richmond residents or workers a convenient alternative to the automobile for commute trips; sufficient parking is available at dispersed major employment centers in Richmond, and there is limited local feeder service to or from the BART station. Because of this limited patronage, BART's impacts on the travel patterns of two specific sub-populations (females and teenagers) who are particularly well represented among Richmond BART users were studied by the Institutions and Lifestyles Project.[43] BART Richmond black ridership represents 32 percent of daily BART patronage versus 12 percent system-wide, and many of these patrons are black women who use BART for employment trips in the East Bay. Richmond youth view BART in much more pragmatic terms than Walnut Creek youth (see Suburban Case Study chapter), and their use tends to be less exploratory, more trip-specific, and somewhat more cautious.

Impacts on Workers' Location Decisions — BART is not very successful in expanding blue collar employment opportunities for Richmond minority residents, simply because it provides poor service to the areas where these people might

43. Jefferson Associates, Inc., Three Community Case Studies: Impacts of BART On Institutions and Lifestyles, pp. 63-76.

find work (Richmond, Oakland, and San Francisco industrial areas, oil refineries, and the Bay Area ports). According to some informants, new feeder links would help, but others indicated that BART provides good service for clerical and professional white collar workers going to downtown Oakland and San Francisco and has been particularly important in helping graduates of the Litton Business College in Richmond find entry level positions in offices -- an impact on the "frictional" unemployment problem, to use economists' jargon. This finding confirms the results of the Downtown Workers Survey conducted in San Francisco. [44]

Impacts on Office Construction -- The redevelopment project area adjoining the BART station remains largely vacant, although the 400,000 square foot Social Security Administration building for 2,000 employees and a new Kaiser Medical complex have located in the area. Another small office building of under 50,000 square feet and new retail uses of 60,000 square feet are the only other significant, new non-residential construction projects in the station area. Richmond averaged only about $.5 million yearly in new private non-residential construction between 1960 and 1976, and no office additions or alterations exceeding $100,000 have occurred in the station area since 1967. Neither the Social Security building nor the Kaiser clinic would have located in Richmond in the absence of BART ; these buildings are the most important BART land use impacts in Richmond to date. [45]

Impacts on Employers' Location Decisions -- The Social Security Administration moved its offices to Richmond from San Francisco to capitalize on the availability of a large site as well as the accessibility provided by BART, thereby allowing workers from a large area to reach the new location by transit. Other major employers, such as the Standard Oil refinery and research center, and the Safeway distribution center were in their locations prior to BART, and are not particularly accessible to BART. Many workers at these facilities could not take advantage of BART due to swing and overnight shifts.

Impacts on Retail Sales -- Richmond has attempted to revitalize the downtown commercial district through the redevelopment process, but these efforts and BART's influence have not been sufficient. Retail sales were declining in downtown Richmond for several years, and the development of the Hilltop Mall Regional Shopping Center three to four miles north of downtown has now precluded restoring substantial retail vitality to the downtown area.

---

44. John Blayney Associates/David M. Dornbusch & Co., Inc., Study of Workers' Location Decisions, pp. 23-26.

45. John Blayney Associates/David M. Dornbusch & Co., Inc., Study of the Office Construction Industry, pp. 28-30.

Impacts on Housing Construction and Rehabilitation — A 173-unit federally subsidized multi-family residential project was built in the BART station area in 1966. It was not induced by BART. Several duplexes also were built in scattered locations. There has been little significant residential rehabilitation in the redevelopment area, and only three rehabilitation loans were issued in the 1975-76 period, according to bank disclosure statements of major lending institutions.[46] BART's major impact near the station was the removal of residential units for station parking. Early market studies suggested the potential of a BART-related demand for rental apartments in the station area, but the low rate of rental construction in the Bay Area and image problems of Richmond (combined with lack of direct BART service to San Francisco) all reduced the potential for this type of development to date.

Impacts on Property Acquisition and Occupancy (Speculation) — Small-scale speculation in residential properties may be occurring in the Richmond BART station area. Presently there is a considerable amount of vacant land around the station, mostly controlled by the Redevelopment Agency. However, this land is not increasing in value, and although prices quoted are rather low, the area still is not attracting developers.

Impacts on Property Prices and Rents -- Effects on property prices and rents were not studied in Richmond, but because much of the land is controlled by the Redevelopment Agency and demand is limited, no BART-related effects would be expected.

Indirect Environmental Effects — At the Social Security center more employees are driving to work than had been expected, causing parking problems in the station area. This is noteworthy because the Administration building was located in Richmond specifically because of BART.

No significant adverse effects on the atmospheric, acoustic, or natural environment are anticipated as a result of the urban renewal project.[47]

Nevin Mall provides variety and pleasant surroundings for BART patrons and guides them to the downtown area in Richmond. Because development in the new downtown is not yet extensive, the new mall is not highly used. It remains clean, and there is no accumulation of litter. There has been no victim-oriented crime and little vandalism.

46. John Blayney Associates/David M. Dornbusch & Co., Inc., Study of the Housing Industry, p. 29.

47. Gruen Associates, Environmental Impact Project Case Studies, p. 13.

BART's Facilities and Operations

Environmental Impacts — There are no significant environmental impacts around the Richmond BART station. Ambient noise levels mask those of BART; no BART-related parking or traffic problems exist because patronage at this station is low. No naturally sensitive areas are disturbed. Visually, the station and its parking facilities are compatible in scale with the surroundings.[48]

ROCKRIDGE

Setting and Chronology

Rockridge is a North Oakland neighborhood covering approximately one square mile and housing approximately 9,000 people in some 4,000 dwelling units, half single family homes and the remainder in duplexes or small apartment buildings. Most of the housing was built between 1900 and 1920, and only 13 percent of the present dwelling units were built after 1930. College Avenue, mostly a commercial strip in the station area, divides the more expensive larger houses to the east from the smaller, simpler houses to the west. College Avenue provides good access on one end to Broadway, the main commercial street of Oakland (downtown Oakland is approximately three miles away), and leads to Berkeley and the University of California approximately two miles to the north in the other direction.

The neighborhood east of the station is mostly white, and the area west has a mix of black and white residents. Many Rockridge households have lived there for 30 years, but recently young couples and singles have been moving in as older residents have left.

A 1958 State Division of Highways decision selecting a freeway route through Rockridge (the Grove-Shafter freeway) was bitterly, but unsuccessfully, fought by Rockridge residents. The freeway median was later chosen for the BART line, and the station location at College Avenue was included in the 1962 Composite Report. Freeway and BART construction occurred at the same time, between 1966 and 1972, with station construction lasting for two years toward the end of the period. The chronology of BART-related milestones (Table 10) indicates virtually no residential development in the Rockridge station area.

BART's Organization, Planning, and Publicity

Coordination: Station and Route Location, Planning and Design — Station and route location were determined by the decision to locate BART in the median of the Grove-Shafter freeway, being built through Rockridge at the same time. The elevated station, located where the freeway and BART cross College Avenue,

48. Ibid.

TABLE 10. MAJOR MILESTONES IN THE ROCKRIDGE CASE STUDY AREA, 1962-78.

BART Planning, Construction and Operation	Year	Public Action	Major Station Area Land Use Changes
Present station location adopted BART bond issue approved	1962		
	1964		
	1966	Lucky Market development application approved	
	1968		Lucky Market construction completed
	1970	Grove Shafter Freeway completed	
Station construction begins		Variance for 83-unit apartment building requested; Rockridge Community Planning Council formed in response to variance request	
Station completed	1972	Rockridge residents call for building moratorium	
Interim service begins			
Transbay service begins	1974	Alternatives for Rockridge land use study completed; Downzoning approved reducing allowed commercial and residential densities near BART	
	1976		
Night service begins			
Saturday service begins	1978		

is located in the freeway median. Community groups were not involved in the early planning stages, but became more active in the late 1960s when the station area was identified as a prime site for high-rise apartment development.

Impacts on Planning and Zoning — Prior to 1974, the zoning in effect in Rockridge (see the 1965 Pre-BART Land Use and Zoning map) would have allowed development of up to 1,400 additional housing units in the station vicinity. In 1966, the Oakland Planning Department denied permission for a new Lucky Market on a station area site it considered more appropriate for high density, BART-related housing, but the City Council overruled the decision and permitted development of the large market. A 1968 Oakland Planning Department report identified the Rockridge area as natural for high-rise apartment development clustered around the BART station, and in 1970 a developer requested zoning for a seven-story, 83 unit apartment building near the station. This crystalized community opposition to the plan for intensification of the neighborhood, and lead to the formation of the Rockridge Community Planning Council (RCPC), a coalition of several smaller neighborhood groups. In response to the neighborhood pressure, the City began further studies of development potential around the Rockridge station, and in December 1974 downzoned the area to implement the most conservative alternative. The new zoning, illustrated on the post-BART zoning map, does not allow any substantial development beyond current uses, and would seem to assure retention of neighborhood character. A Citizens' Design Review committee also was established to review future proposals.[49]

Because of this community opposition to any major change, Oakland initiated no redevelopment proposals or public improvement programs for the Rockridge station area.

BART's Construction Process

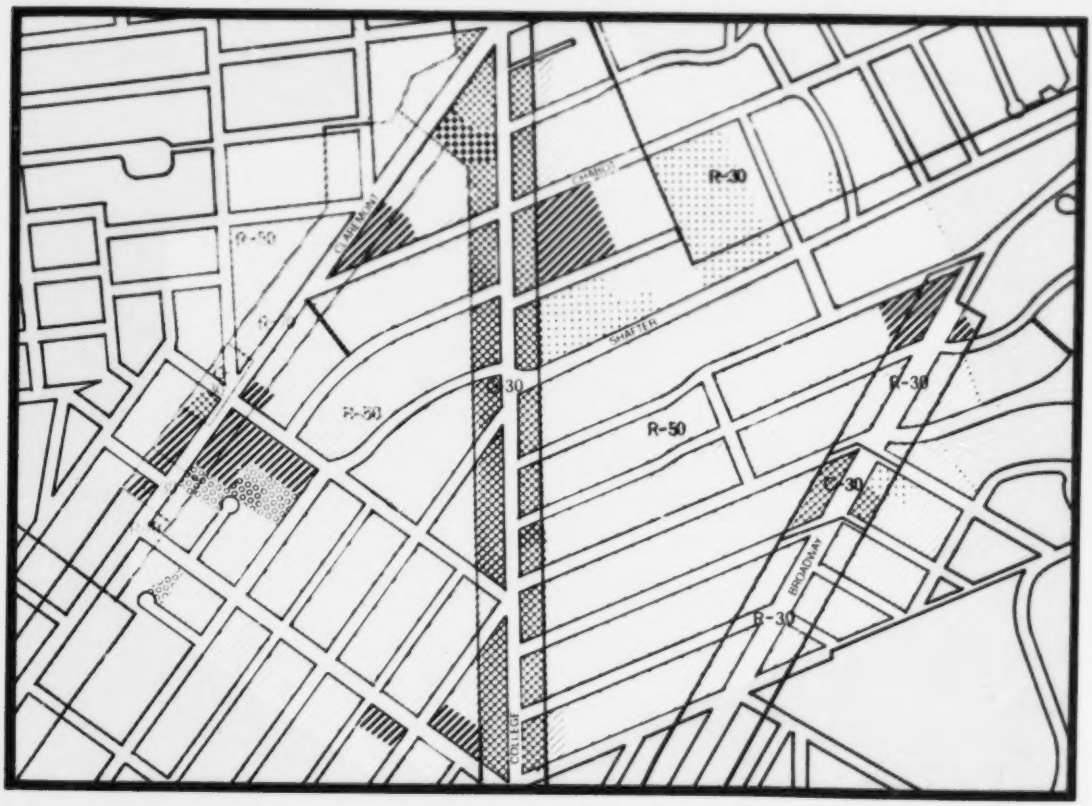
BART's Property Acquisition — From MacArthur station to the point at which BART enters the Berkeley hills tunnel, a total of 16.6 acres was acquired by BART and the California Department of Transportation (Caltrans), two acres of which was surplus. Because the Grove-Shafter freeway median was widened 80 feet to accommodate BART, a portion of the Caltrans "take" properly should be charged to BART. (Parcels extending no more than 40 feet within the freeway right of way line were classified as a BART-related acquisition.) Displacement attributable to BART included 130 residential units — 108 of which were due to the freeway widening.

Construction Impacts — The station was built in the freeway median concurrently with the freeway, and the construction had little effect on retail sales at nearby commercial establishments or on rehabilitation or maintenance of nearby properties.

49. Jefferson Associates, Inc., Impacts of BART on Bay Area Political Instiutions. (Berkeley: BART Impact Program Institutions and Lifestyles Project Technical Memorandum), May 1977.

ROCKRIDGE STUDY AREA MAPS

62A



ROCKRIDGE STATION AREA
1965 PRE-BART LAND USE AND ZONING

North

200' 400' 600'

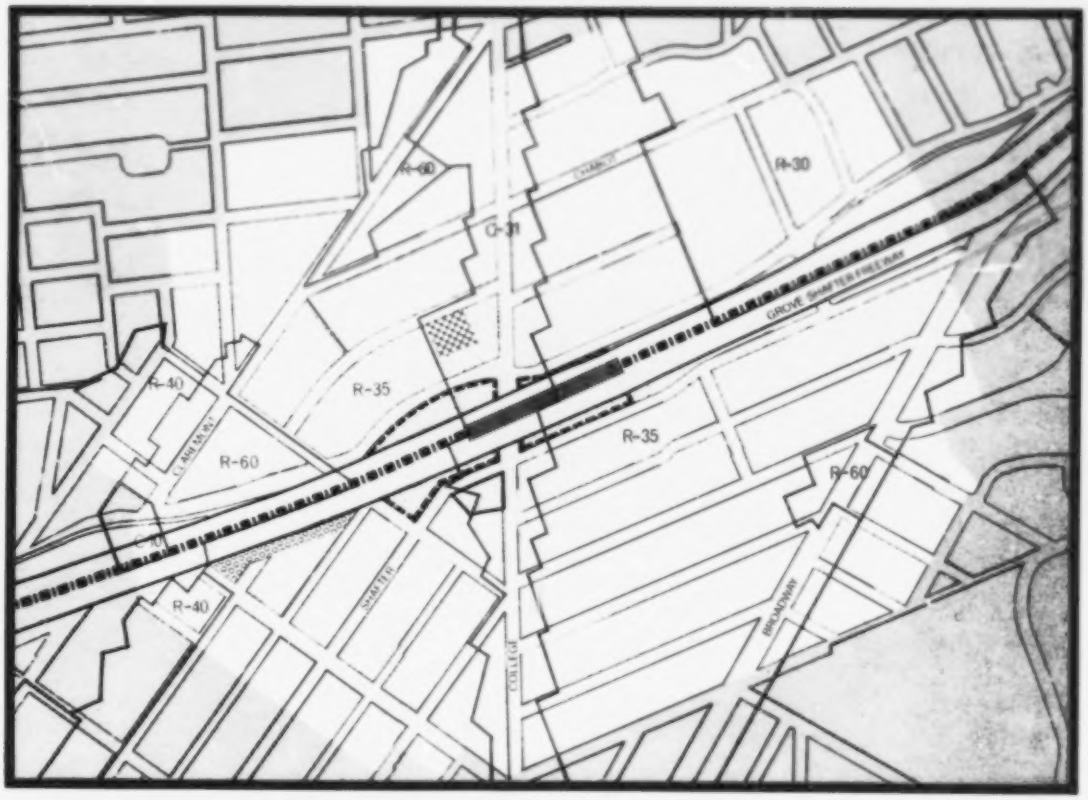
LAND USE

- Single Family Residential
- Multi-Family Residential
- Commercial and Office
- Industrial
- Public and Institutional
- Park Open Space
- Vacant

1965 ZONING

R-30	Single Family Residential
R-50	Medium Density Residential
R-70	High Density Residential
C-30	District Thoroughfare Commercial

62B



ROCKRIDGE STATION AREA
1965-77 LAND USE CHANGES AND ZONING

North

200' 400' 600'

BART
- Station Platform
- Parking
- Subway Line
- Surface Line
- Aerial Line

LAND USE
- Commercial and Office
- Park, Open Space
- Demolition (no new use)
- Parking

1977 ZONING

R-30	Single Family Residential
R-35	Single and Two-Family Residential
R-40	Garden Apartment Residential
R-60	Medium-High Density Residential
C-30	Local Retail Commercial
C-31	Special Retail Commercial

62C

Environmental Impacts — Because the station and line are in the median of the Grove-Shafter freeway which was built simultaneously with BART, construction impacts were virtually inseparable from the far more extensive impacts of freeway construction. Actual freeway construction extended over a four and one-half year period (1967 to 1971), and station construction occurred between 1970 and 1972.

BART's Transportation Service

Impacts on Travel Behavior -- From the Rockridge station the average journey to work by transit is reduced three and one-half minutes with BART; 33 minutes versus 36½ minutes with the No-BART Alternative -- a 10 percent savings. Off-peak transit travel time savings for shopping trips, for example, are only two minutes with BART, a six percent savings over average trip time under the NBA assumption (29 versus 31 minutes).

With BART, peak hour transit travel times to downtown San Francisco are reduced from 39 minutes under the NBA assumption to 32 minutes, an 18 percent saving. However, to downtown Oakland, the workplace of 40 percent of Rockridge residents, the NBA offers equivalent service -- 22 minutes.

In March 1978, about 2,200 daily BART trips started or ended at the Rockridge station, indicating that about four percent of the population living within three miles used BART. Seven percent of all trips ending at the Rockridge station originated from two of the Oakland urban core stations, 37 percent from other East Bay stations, 50 percent from the four downtown San Francisco stations, and six percent from other West Bay stations. A 1976 socio-economic profile (see Table 11) of these BART riders showed that more were males (56 percent) than females (44 percent). A large majority were white (86 percent); five percent were Asian, five percent were black, and the remaining four percent were mostly Spanish-Americans. About 60 percent of these users had four or more years of college education, and 53 percent had family incomes over $15,000 in 1976, considerably higher than the educational and income levels for BART users from the other urban residential case study areas.[50]

The Rockridge station has three connecting bus lines, including one that connects the station to the University of California. About 42 percent of the station users park-and-ride, while 27 percent walk, 22 percent arrive by bus, and only eight percent are dropped off. The 766 BART-supplied free parking spaces usually satisfy the parking space demand.

50. Peat, Marwick, Mitchell & Co., Travel Data for BART Station Area Case Studies.

All those living within one mile of the BART station are no more than three minutes drive from BART, while the six minute contour encompasses about 10 square miles, approximately bounded by Ashby and Shattuck in Berkeley to the north and west, and Pleasant Valley and Moraga to the south. In 1976, close to half the morning riders driving to BART lived within five minutes of the station.

Impacts on Workers' Location Decisions — There are no major concentrations of employment near the Rockridge station, so this impact was not studied.

Impacts on Office Construction — With the exception of a new bank built almost 1,500 feet from the station, there has been no office development in the vicinity of BART.

Impacts on Employers' Location Decisions — Neighborhood groups effectively precluded any major new development in the station area through influencing land use policies directed toward preserving the existing scale and character of development there. Subsequently, no significant new employers or retailers have located in the area, with the exception of a Lucky's Market — not really related to BART.

Impacts on Retail Sales — Effects on retail sales were not studied in Rockridge, but it is not expected that BART had any significant effect on College Avenue retail facilities, and no new retail uses located there in response to BART.

Impacts on Housing Construction and Rehabilitation — Since the Rockridge station area was fully developed before BART, and the 1974 rezoning lowered allowable densities, the lack of station area development or redevelopment is not surprising. During the past 12 years only 11 small buildings have been constructed within 1,500 feet of the station — none of which are for residential use. The demand for housing in Rockridge has been high, and prices have escalated as many young, higher income households have moved into the neighborhood in recent years. Rehabilitation of housing has increased, but neither this nor the price increases are directly related to BART.

Impacts on Property Acquisition and Occupancy (Speculation) — Some speculation has occurred in residential and small commercial properties around the station, especially on or near College Avenue, the major arterial bisecting the station area, and mostly was evident around the time of BART's construction (1967-1972). This speculation was never extensive and has now halted. Informants suggest that it was partly attributable to BART; however, other factors such as the Grove-Shafter freeway, proximity to the University of California, and good AC Transit access also made the Rockridge area attractive for speculation. The 1974 downzoning together with reduced expectations for a "BART market" probably put an end to such speculation.

Impacts on Property Prices and Rents -- At Rockridge, this impact was not examined by the Land Use and Urban Development Project, but an earlier study concluded BART had no impact on residential property values probably in the station vicinity.[51]

Indirect Environmental Effects -- Because no BART-related development has occurred, there have been no BART-related indirect environmental impacts.

BART's Facilities and Operations

Environmental Impacts -- At this station, potential environmental impacts are indistinguishable from the more extensive effects of the freeway. Possible BART-related noise, local air quality, and visual effects are all dominated by those of the freeway. Some BART riders park on adjacent streets within one block of the station even though the station's parking lot is not full. No other environmental impacts have been observed or reported.

SIMILARITIES AND DIFFERENCES

Although all three areas were designated urban residential and consist of older, fully developed neighborhoods, there are important differences. The Richmond station area includes a downtown area as well as a residential area, and the area is mostly automobile-oriented, but with better transit service than the suburban case study areas. Rockridge is a residential area of mostly single family, owner-occupied houses and duplexes, with only neighborhood commercial facilities, again mostly auto-oriented. The Mission District -- a rental area -- has by far the highest density of the urban residential case study areas, is quite dependent on transit service, and has a high degree of neighborhood and community level shopping facilities (in fact, the Mission District population is larger than that of the City of Richmond).

In contrast to Rockridge and the Mission stations which are primarily origin stations, the Richmond station serves as both an origin for residents working elsewhere and a destination for those working in downtown Richmond (presumably

51. Skaburskis, Andrejs, The Impacts of BART on Property Values: A Case Study of the Rockridge Neighborhood (Berkeley: BART Impact Program Working Paper, January 1976).

at the Social Security Administration, the major BART accessible employer). Socio-economic characteristics of riders for these stations are compared in Table 11.

BART acquisition and construction effects were quite different. In Richmond acquisition dislocated 170 households, as well as commercial and industrial facilities, but had little impact on remaining residents or businesses. In contrast, virtually no land was acquired for the subway through the Mission, but BART's construction disrupted business on Mission Street for almost five years. In Rockridge there was some acquisition and relocation as well as construction, but the effects of BART were minor compared to the freeway built on the same alignment.

Finally, while there were some land use changes in each case study area (see Table 12), the changes in Rockridge and the Mission were scattered and generally not BART-related, while most changes in Richmond were near the station and related to BART.

BART has had impacts on all three urban residential case study areas, but the nature of these impacts have differed substantially. Only in Richmond have the impacts resulted in land use changes; in Rockridge and the Mission District BART served as a focus for the communities to define their goals and organize toward achievement through political action.

- In the Mission and Rockridge areas initial public policies intended to accommodate BART-induced development have been modified because of community opposition to intensive station area land use. This reaction to permissive zoning probably would have occurred in the absence of BART if another perceived threat of change had appeared imminent. Residents' fears of BART's impacts crystallized well before actual service began, but were not addressed in the early BART planning. Later studies sought to reflect neighborhood concerns in station area planning and zoning decisions. Particularly in the Mission District, fears of BART's potential impacts were based upon patronage estimates some five times the reality, and it is interesting to speculate about the degree of opposition that might have arisen had more realistic patronage estimates been used to forecast effects on station area housing construction and redevelopment.

- In Richmond, by contrast, BART was viewed as an opportunity, providing a focal point for implementation of a downtown redevelopment plan. Community opposition to expected BART impacts was negligible, probably because the City already was committed to station area redevelopment. BART served as a catalyst for public decision making in much the same way that it did in downtown San Francisco and Oakland. Although some BART-related downtown development has occurred, limited market demand for both commercial uses and market rate housing have precluded more construction.

TABLE 11. CHARACTERISTICS OF BART USERS —
TRIPS ORIGINATING IN THE URBAN RESIDENTIAL CASE STUDY AREAS

	Mission District	Richmond	Rockridge
Daily BART Patronage (Trips - March 1978)	5,700[a]	1,600	2,200
Income: Percent earning over $15,000 in 1976	28.7	30.8	53.0
Median Age	30	30	31
Education: Percent with Four or More Years College	40.4	26.8	60.4
Sex: Percent Male	52.5	41.0	55.8
Ethnic Status (Percent Distribution)			
— Black	4.7	31.9	5.0
— Spanish Heritage	22.8	7.4	2.6
— Asian	6.3	2.9	4.5
Median Trip Time (Minutes)	28	52	47
Work Trips: Percent of Total Trips	61.8	56.3	66.6

a. Combined patronage for 16th Street and 24th Street stations.

Source: 1976 BART Passenger Profile Survey

TABLE 12. URBAN RESIDENTIAL CASE STUDY AREAS:
SUMMARY OF 1965-77 STATION AREA LAND USE CHANGES[a]

New Construction	Mission District	Richmond	Rockridge
Single Family Residential (Units)	—	2	—
Multi-Family Residential (Units)	18	179	—
Office (Square Feet)	7,000	55,000	7,500
Retail Commercial (Square Feet)	40,000	50,000	38,000
Other Commercial (Acres)	1.5	0.3	—
Institutional and Government (Acres)	2.2	11.3[b]	—
Industrial (Acres)	0.2	—	—
Parking (Acres)[c]	1.3	2.7	—
Demolition — No Redevelopment (Acres)			
Residential	1.3	5.2	0.4
Non-Residential	2.4	2.8	0.5
Total	3.7	8.0	0.9

a. Station area includes all land within 1,500 feet of a BART station.
b. Includes 400,000 square foot Social Security Administration Building.
c. Includes only land solely devoted to parking; all other land used for parking is assigned to the principal use category, commercial or office, industrial, etc. that parking serves.

Source: John Blayney Associates

- Alignment decisions (subway in the Mission and shared right of way in Rockridge and Richmond) effectively minimized long-term adverse environmental impacts. The duration of the subway construction in the Mission and small working space caused greater construction impacts than in the other areas.

- BART usage represents a small proportion — three to five percent of those living within one to three miles of a station -- because BART does not provide a clearly superior alternative to the automobile or other transit systems -- AC Transit in the East Bay and Muni in San Francisco. As a consequence, BART does not have as pronounced an effect on residents' location decisions as in suburban areas.

- BART had a strong effect on the downzoning in the Mission and Rockridge that resulted in no major land use changes, and BART was clearly responsible for locational decisions on two major projects in the Richmond station area (Social Security and Kaiser) in connection with the City's redevelopment program.

Gains and Losses

In the Mission District, merchants who were affected by BART construction were short term losers, but they may gain from increased pedestrian traffic in the long term. The fear of potential BART impacts provided a focus for community organization in the Mission; the increase in neighborhood consciousness and resulting downzoning will help long-term neighborhood stability. In turn, this has had a negative effect on owners who were speculating on opportunities for intensification and also may have a long-term negative effect on potential BART patronage from the area. Clear distinctions between the benefits accruing to minorities specifically, as opposed to others living in the Mission and using BART, cannot be drawn, but to the extent that BART serves the Mission, it serves minorities.

In Richmond, it is premature to identify long term winners and losers from BART as much depends on the future success or failure of the BART-related redevelopment process. To date, the taxpayers and residents of the City probably gained from the use of BART credits toward the local share of redevelopment costs, while those individuals and businesses relocated may have gained or lost depending on individual circumstances. Few residents are BART users, and therefore there are few -- mainly minorities -- who benefit directly from BART service.

In Rockridge, there is the same long-term benefit of community organization and stability as in the Mission District, and downzoning adversely affected prospects for increased BART patronage from the area. Otherwise, BART seems to have had little effect on community businesses or residents, with the exception of increasing mobility for those who use the system.

POLICY IMPLICATIONS

Fewer policy implications can be drawn from the urban residential case studies because of changes in federal programs and funding procedures. The clearest example of this is the use of BART station expenditures partially in lieu of local cash share for HUD-sponsored urban renewal projects, as was done in Richmond. Under the federal Community Development Block Grant Program the opportunity to use transit expenditures in this manner is not available.

The second example of this is the neighborhood opposition that arose to potential BART-induced land use changes only after the system was under construction. Current requirements for community participation in the planning process, which did not exist in 1960 and were not used in the initial station planning decisions for BART, guarantee greater citizens' understanding of potential impacts and should increase the probability that rail rapid transit plans will be acceptable to all parties.

Where a rail transit system, or any transit system for that matter, does not substantially improve mobility, as is the case in all of the urban residential case study areas, it should not be expected to have dramatic effects on land use patterns. Even in the absence of land use restrictions, there may not have been substantial urban development impacts in Rockridge and the Mission because bus transit serves most potential BART trips. As is illustrated well by the experience in Richmond, provision of rail transit service and stations will not generate a viable market demand in communities where demand was weak prior to the system. BART in itself was not sufficient to attract a regional shopping center to the Richmond downtown redevelopment area, but rather developers choose a site several miles away with freeway access and an orientation to a higher income trade area. Although downzoning in the Mission did reduce the number of potential sites for higher density housing, private opportunities for commercial intensification remain, but redevelopment is not feasible from a market standpoint.

5. SUBURBAN STUDY AREAS

OVERVIEW

Walnut Creek and Fremont are typical of suburban communities that have experienced rapid growth in the last two decades. Both stations, which have similar daily usage rates, serve largely white resident populations of above median income, although the minority population is growing substantially in Fremont. Both stations adjoin subregional business districts or shopping centers, and function predominantly as origin park-and-ride transit facilities serving as "end-of-the-line stations" (the San Ramon Valley south of Walnut Creek is served by the Walnut Creek station). A majority of Walnut Creek workers are employed in downtown Oakland or San Francisco. Fremont is less oriented to the central cities, but its share of Oakland and San Francisco commuters is increasing.

In Walnut Creek the BART line and station site required taking of developed property. The station is situated on the fringe of an older shopping district that has undergone major retail and office expansion. By contrast, the Fremont station was located in a largely undeveloped portion of the City long planned as the "central district". Disruption of existing patterns was minimal, and much of the land surrounding the station remains vacant.

Comparative statistics for the suburban case study areas are presented in Table 13 and patronage trends in Figure 5. Average growth rates for employment and population have been substantial in both communities, but higher in Fremont. BART usage is about the same at each station, but Fremont ridership has increased at a somewhat faster annual rate (10 percent versus 6 percent).

Impacts on the two suburban study areas which have been found to date by the BART Impact Program are summarized in the following sections.

WALNUT CREEK

Setting and Chronology

Although it was incorporated in 1914, Walnut Creek is a predominantly suburban community situated some 15 miles east of Oakland and 25 miles from San Francisco. It is located at the intersection of two main freeways (Interstate 680 and State Route 24) and occupies a central spot in Contra Costa County. Automobile and bus access to San Francisco is constrained by capacity limitations and congestion on the Bay Bridge and through the Caldecott Tunnel.

Walnut Creek has the highest median family incomes and lowest percentage of minority residents of any case study area. With annexations, its growth rate has been phenomenal, increasing from approximately 2,500 in 1950 and 9,900 in 1960, to 40,000 in 1970 and 48,000 in 1977. Although Walnut Creek serves as a sub-regional center for business and retail sales and services, it primarily is a residential community with many commuters to San Francisco and Oakland.

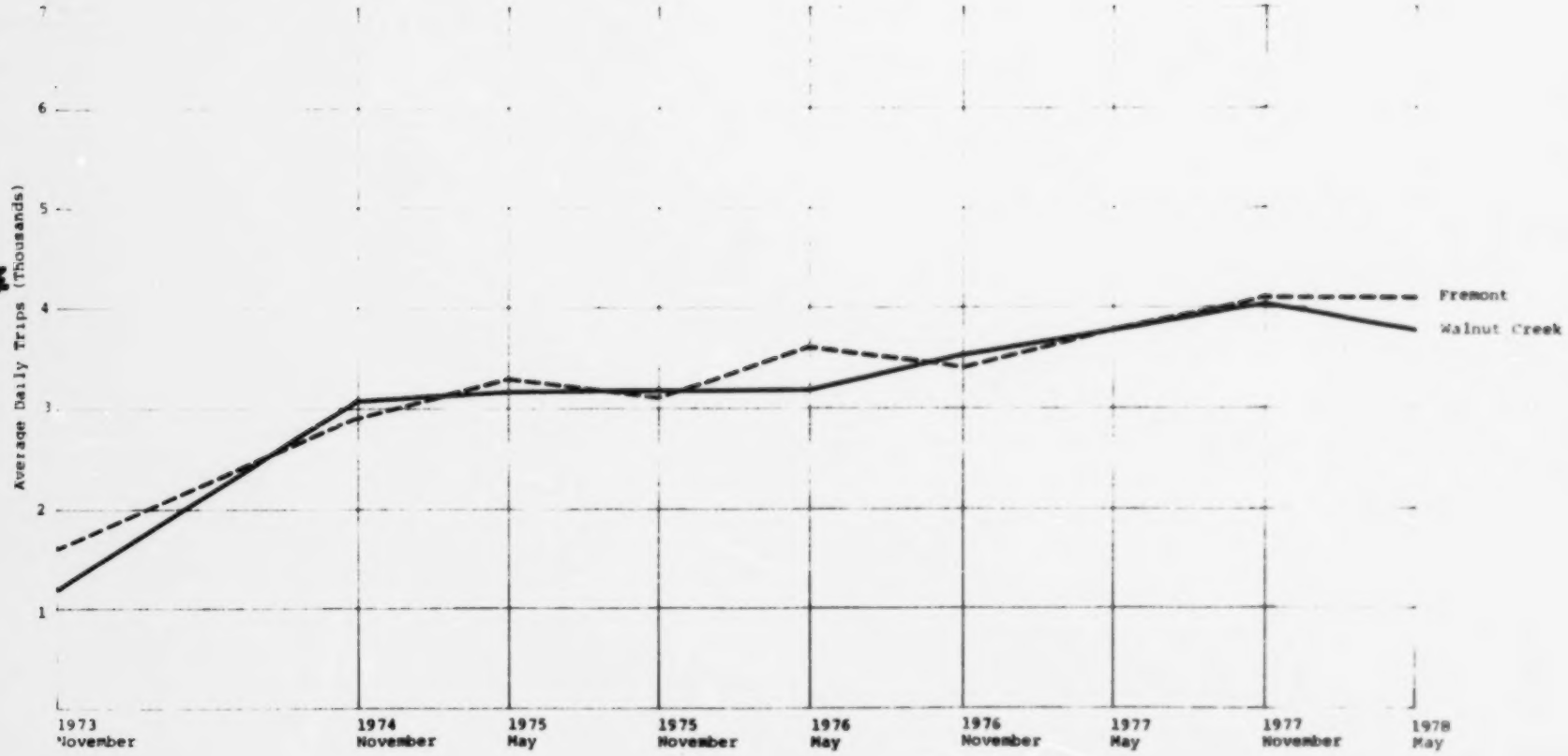
TABLE 13. SUBURBAN CASE STUDY AREAS: SUMMARY STATISTICS

	Walnut Creek[a]	Fremont[b]
Employment		
1965[c]	21,000	13,600
1970	28,000	23,700
1975	32,700	26,800
Average Annual Growth Rate (Percent)	4.5	7.0
Resident Population		
1960	42,100	46,700
1970	64,800	104,900
1975	82,600	121,300
Average Annual Growth Rate (Percent)	4.6	6.6
1970 Residents' Demographics		
Percent Black	0.3	0.4
Percent Spanish Surname	4.3	16.1
Median Family Income (1969 Dollars)	14,600	12,700
Average Daily BART Patronage (1978)	3,800	3,900

a. MTC analysis zones: 94, 96, 98, 99, including areas outside the City of Walnut Creek.
b. MTC analysis zones: 195, 196, 197, 198, 199, 203, 204
c. The 1965 data for employment may not be accurate.

Source: U.S. Census, Association of Bay Area Governments, BART

FIGURE 5. WALNUT CREEK AND FREMONT CASE STUDY AREAS: BART PATRONAGE TRENDS, 1973-78



Source: BART

BLANK PAGE

BLANK PAGE

TABLE 14. MAJOR MILESTONES IN THE WALNUT CREEK CASE STUDY AREA, 1962-78.

BART Planning, Construction and Operation	Year	Public Action	Major Station Area Land Use Changes
Station location adopted BART bond issue approved	1962	General Plan adopted	
	1964	First Core Area Plan adopted; Zoning ordinance adopted	
	1966	I-680 Freeway extended to Livermore Valley	
	1968		Walnut Creek Plaza Building planned; Diablo Keys Apartments planned
Station construction begins	1970		Cost Plus construction begins
Station completed		Zoning ordinance amended to increase parking requirements in Central Commercial District	Walnut Creek Plaza Building construction begins; Cost Plus completed
	1972	Revised General Plan adopted; Transportation Committee formed; Rezoning adopted in conformance to General Plan revision	Diablo Keys construction begins; Walnut Creek Plaza Building completed
Interim service begins		BART Station Area Plan completed but not adopted	Diablo Keys completed and open for occupancy
Transbay service begins	1974	Shuttle bus service to BART begins; Contra Costa County Local Mass Transit Agency measure defeated	
		Second Core Area Plan adopted; Comprehensive Transportation Plan completed	
	1976		
Night service begins		Zoning revised to conform to Core Area Plan	
Saturday service begins	1978		

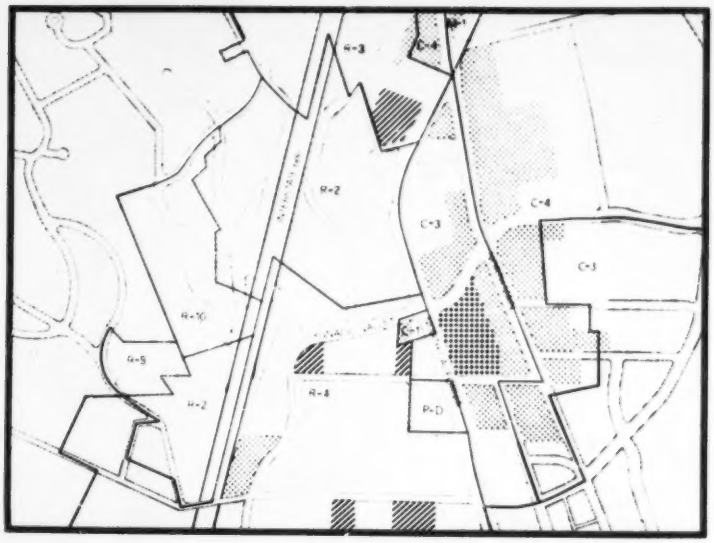
WALNUT CREEK STUDY AREA MAPS

74-A

WALNUT CREEK STATION AREA
1965 PRE-BART LAND USE AND ZONING

North

300 600 900



LAND USE

- Single Family Residential
- Multi-Family Residential
- Commercial and Office
- Industrial
- Public and Institutional
- Vacant
- Parking

1965 ZONING

R8 R10 R2	Single Family Residential
R-3	Medium Density Residential
R-4	High Density Residential
C3 C1	Central Neighborhood Commercial
C-4	General Commercial
M-1	Light Industrial
P-D	Planned Development

1961 GENERAL PLAN

1961 GENERAL PLAN

- Single Family Residential
- Multi-Family Residential
- Retail Commercial
- Institutional

74-B

WALNUT CREEK STATION AREA
1965-77 LAND USE CHANGES AND ZONING

North
300' 600' 900'

BART
- Station Platform
- Parking
- Subway Line
- Surface Line
- Aerial Line

LAND USE
- Single Family Residential
- Multi-Family Residential
- Commercial and Office
- Demolition/no new use
- Parking

1977 ZONING

R8 R10 D3	Single Family Residential
M-3 M-2	Low Medium Density Residential
M-1	High Density Residential
C-C C-N	Central Neighborhood Commercial
C-G	General Commercial
E-L	Light Industrial
P-D	Planned Development

1975 GENERAL PLAN

1975 GENERAL PLAN
- Single Family Residential
- Multi-Family Residential
- Office Retail Commercial
- Office Commercial
- Institutional
- Auto Sales and Service
- Elective Uses
- BART Station

74-C

The City operates under a council-manager form of government and relies extensively on citizen advisory groups in decision making. Homeowners' associations have been formed to protect individual neighborhoods. The Chamber of Commerce is active in city affairs and, with the downtown business community, has led the campaign to preserve the Walnut Creek core area.

Major milestones in Walnut Creek are shown in Table 14.

BART's Organization, Planning, and Publicity

Coordination: Station and Route Location, Planning and Design — Route and station alignment decisions for the most part reflected the City's participation in the planning process. In the 1956 plan, the initial proposed alignment along the railroad right of way with the BART station located downtown was strongly opposed by the downtown merchants. BART's engineers also wanted a greater distance between the Lafayette and Walnut Creek stations. The current alignment and more northerly location for the elevated station were included in the 1962 Composite Report and plan, but detailed planning for the BART station area was not begun until 1967.

Walnut Creek made no changes in its governmental organization for purposes of coordination with BART. A transportation planner was hired in 1972, but mainly to deal with issues not related to BART.

Impacts on Planning and Zoning — Walnut Creek zoning boundaries varied little during the 12 year BART study period although the zoning district names themselves were changed to conform to a county-wide designation. The Central Commercial (C-C) District was extended into the General Commercial (C-G) District along Ygnacio Valley Road and the higher density Multi-Family Residential category (M-2) incorporated Duplex Residential (D-3) acreage between California Boulevard and Interstate 680. (See Walnut Creek Station Area maps of pre- and post-BART land use and zoning.)

The 1972 General Plan, adopted following a four year study, recommended high density residential development for the station area. The 1973 proposed BART Station Area Plan recommended high-rise residential and commercial development in the station area, but this plan was not adopted, primarily because of disagreement over height limits. These issues eventually were resolved in the 1975 Core Area Plan and the January 1978 station area rezonings. The 1978 rezoning is a direct implementation of the 1975 plan; the new zoning districts correspond to the plan designations. The 1978 rezoning retained an independent Automobile Service District, expanded the downtown office and retail commercial areas and created two Planned Development zones to the north and southeast of the BART station where a compatible mixture of retail business, offices and apartments may be located. Note that this 1978 rezoning is not reflected on the post-BART zoning map because of the June 1977 cut-off date for the Program-Wide Case Studies.

Impacts on Local Government Expenditures — BART's primary cost impact on Walnut Creek has been related to street traffic improvements and feeder bus service. Projects include construction of California Boulevard, realignment of Oakland Avenue, three intersection improvements, and the Ygnacio Valley Road widening, including a left turn lane for BART station access. However, because these projects are only peripherally related to BART, no budgetary impact was estimated by the Public Policy Project. The BART downtown shuttle bus system has an annual $130,000 budget financed as follows: 15 percent from fare box revenues, 50 percent from an override tax on business licenses, and 35 percent from the general fund.[52]

BART's Construction Process

BART's Property Acquisition — Because of the large parcel sizes, BART acquired 76.4 acres in the City of Walnut Creek to avoid excessive severance costs. As of November 1977, four-fifths of the 24.5 acre surplus had been sold. More than half of the property acquired by BART for its facilities (29.8 acres) was in single family residential use, and about 170 housing units were displaced, mainly for parking. Business displacement was minimal; only 1,000 square feet of land was classified in commercial use.

Construction Impacts — Cost Plus, a store which faces the BART station and opened during the construction period, reported that its sales were unaffected by BART. No other retail stores are located close enough to the BART tracks to have been disrupted by construction activities.

Environmental Impacts — The area around this station is characterized by mixed land uses — single and multi-family housing, commercial, and light industry. Typically, for suburban stations, the most disruptive period of construction averaged only about six months. All construction was accomplished during daytime hours. The test track was built during a one and one-half year period, 1964-65, while station and line construction extended over four years (1968 to 1972). Surveys taken at other suburban station sites (El Cerrito Plaza, Concord, and Daly City) suggest that impacts around the Walnut Creek station may have included construction noise impacts in the residential areas, dust and dirt associated with the construction effort, and minor reductions in traffic safety and access. No specific impact studies were conducted by the Environment Project at the Walnut Creek station.

52. Booz, Allen & Hamilton, Inc., The Impacts of BART on Local Government Expenditures, Revenues, and Financial Policies, p. 24.

BART's Transportation Service

Impacts on Travel Behavior -- Mobility comparisons show that BART reduces the average journey to work by transit about eight minutes, a 14 percent saving over estimated times in the NBA (48 versus 56 minutes). For off-peak travel the saving with BART is even greater; the average shopping trip to major shopping areas from Walnut Creek would take 30 minutes less with BART than the NBA — a 44 percent saving (38 versus 68 minutes).[53]

From Walnut Creek peak-hour transit travel times to downtown Oakland are reduced from 46 minutes under the NBA assumption to 35 minutes with BART, a 24 percent saving. To downtown San Francisco, the reduction is nine minutes — a 16 percent saving (49 versus 58 minutes).

The I-680 freeway provides excellent access from the San Ramon Valley to BART; Alamo is only a six to nine minute drive from the station while Danville lies between the nine and 12 minute contours. To the northeast, the Pleasant Hill BART station is within the six to nine minute contour. Three-quarters of the Walnut Creek work trip patrons report driving time to BART of under 10 minutes.

In March 1978 about 3,800 daily BART trips started or ended at the Walnut Creek station. For all trips ending at the station, 12 percent originated from the two downtown Oakland stations, 26 percent from other East Bay stations, 58 percent from the four downtown San Francisco stations, and four percent from other West Bay stations. Three-fourths of all trips starting at the Walnut Creek station are work-oriented; others are mainly school and personal business (including shopping) trips.

A 1976 socio-economic profile of Walnut Creek station BART users shows more males (56 percent) than females (44 percent) used the system. A vast majority were white (92 percent); 4 percent were Asian, 2 percent were black, and 2 percent were Spanish-American. About 51 percent of the BART users had four or more years of college education and 69 percent had family incomes over $15,000 in 1976.[54]

The Walnut Creek station has one connecting BART express bus route operated by AC Transit. In addition, the City of Walnut Creek provides two local feeder shuttle bus routes, but only 11 percent of the station patrons use buses as a means of access. The majority (56 percent) of access trips are made by people who park and ride. However, park-and-ride access is constrained by the shortage of free parking provided by BART. Typically, the station parking lot (1,156 spaces) is full by 7:30 AM, and several hundred cars park on surrounding streets for some distance from the station. Approximately 18 percent of patrons are dropped off, and an additional 16 percent walk to the station.

53. John Blayney Associates/David M. Dornbusch & Co., Inc., Accessibility Mapping, p. 12.

54. Peat, Marwick, Mitchell & Co., Travel Data for BART Station Area Case Studies.

Impacts on Office Construction -- Outside downtown San Francisco and Oakland, the most striking impact BART has had on private office construction is the Walnut Creek Plaza Building (now the Fidelity Building), a 135,000 square foot, 10-story building constructed across the street from the station in 1972 specifically because of BART. Dillingham Corporation, the developer, originally planned twin buildings but abandoned that plan, in part because of changes in zoning regulations (as well as initial rental problems). Initially, the City encouraged high-rise development in the station area and reduced parking requirements to one-half normal for floors three and four and one-quarter normal for all floors above the fourth. As a minimal number of the Walnut Creek Plaza building employees use BART for commute purposes (estimated at less than 10 percent), a shortage of parking occurred. To correct this the current owners (the building recently was sold) are doubling the parking space through construction of a structure. Although BART helps the building through its identity and visibility, the developer now believes that BART service did not assist in renting space.

Walnut Creek Plaza served as a trail blazer for office construction in the station area. Between 1960 and 1972, a savings and loan office was the only office of any significant size to be built in the vicinity. Since that time, however, nine offices costing between $100,000 and $800,000 each have been built within three-tenths of a mile of the BART station. The share of the City's office construction near BART has risen from less than five percent in the 1960s to almost a third of the total value of office construction since 1970. Walnut Creek's share of total new office construction in the BART region doubled from about 1.5 percent in the 1960s to 3.5 percent from 1974 to 1976, but the Walnut Creek Plaza building is the only one directly attributed to BART.

Office alterations and additions have not been measurably affected by BART.[55]

Impacts on Employers' Location Decisions -- Although several major employers recently moved into the Walnut Creek area (Cost Plus store and Safeway offices), no employer indicated its location decision would have been different in the absence of BART.

Impacts on Retail Sales -- Sales volume in Broadway Plaza (a regional shopping center located at the southern end of the Walnut Creek shopping district) increased greatly (52 percent in real dollars) from 1963 to 1972, and a recent survey of shoppers found that nearly 25 percent of the persons shopping in downtown Walnut Creek had begun to patronize the area during the last three years.[56] However, there is somewhat contradictory evidence on whether or not BART has contributed to this rise in retail sales. The Shoppers Survey suggested that BART may have shifted sales to Walnut Creek; a higher proportion of new shoppers than long-term shoppers use BART, and many of the new shoppers using BART cited BART as a reason for starting to shop in downtown Walnut Creek.

55. John Blayney Associates/David M. Dornbusch & Co., Inc., Study of the Office Construction Industry, p. 31.

56. John Blayney Associates/David M. Dornbusch & Co., Inc., Study of Retail Sales and Services.

A shuttle bus runs between BART and the Broadway Plaza shopping center, but a total daily patronage of only 500 (including employees) suggests that this is not the chosen mode for a large proportion of Walnut Creek shoppers. This does provide some benefit to the Walnut Creek shopping district in relation to competitive facilities, but downtown Walnut Creek is essentially auto-oriented, and no new retailers have located in response to BART.

The Institutions and Lifestyles Project reported that Walnut Creek merchants felt BART had caused more trade to be lost to San Francisco and Oakland than was gained in Walnut Creek, an observation supported by the 1976 BART Passenger Profile Survey that indicated two and a half times more BART shopping trips originating from the Walnut Creek station than ending at the Walnut Creek station.

The 1977 Shoppers Survey found that several new shoppers in downtown San Francisco and downtown Oakland who use BART formerly shopped in Walnut Creek (three of 48 new shoppers in San Francisco and two of 29 new shoppers in Oakland).

Impacts on Households' Location Decisions -- BART has affected the locational decisions of recent movers in Walnut Creek. While BART has rarely been a major factor in the decision to move (changes in housing needs, household size, or income are major determinants of a decision whether to move) BART was a criterion in the location decisions of 93 percent of Walnut Creek movers who use BART for commuting, and surprisingly over 50 percent of non-BART commuters. A regression analysis indicated that a downtown San Francisco work location, the length of the commute trip, or a downtown Oakland work location were the key determinants of whether a household considered BART in its residence location decision. Socio-economic characteristics were not important once the employment location was given, although the downtown San Francisco and Oakland workers among Walnut Creek movers tended to be older, better educated, and have higher incomes than those who worked elsewhere.

Those influenced by BART tended to be homeowners rather than renters, suggesting that for owners, BART represents a means of protecting their investment should congestion reach intolerable levels or gasoline shortages limit automobile use. This probably accounts for the "hedgers", those for whom BART was an important consideration, but who do not use it for commuting.

Although approximately 50 percent of BART commuters and 20 percent of non-BART users expressed a willingness to pay a premium for housing near BART, there was no significant difference in BART's importance in the location decision for households living within a 10 minute walk of the station versus those beyond walking distance.[57]

57. John Blayney Associates/David M. Dornbusch & Co., Inc., Study of Households Location Decisions, p. 38.

Impacts on Housing Construction and Rehabilitation — According to key informants, BART affected the timing, location, and/or market orientation of three major projects in Walnut Creek: Diablo Keys, Stoneridge, and Bancroft Village. Diablo Keys and Stoneridge are luxury, high amenity apartment complexes, with 788 and 339 units respectively, and rents ranging from $240 to $600 per month. Both were built in anticipation of BART, and Diablo Keys had some difficulty renting units until BART began operation. Bancroft Village is a 400 unit townhouse development, started in 1976 with prices of $77,000 to $87,000. The timing of this latter project was advanced one year as a result of BART.[58]

The above developments influenced by BART are not within the 1,500 foot easy walking radius of the station, although Diablo Keys is approximately one-half mile and runs a shuttle service to the station for residents. Analysis of Walnut Creek building permit data indicated little clustering of rental housing in the station area that could be related to BART. The majority of apartment units built near the Walnut Creek station were built in the early 1960s when the area was developing. Since that time new residential development in Walnut Creek has been further from the station, as most station area land zoned for multi-family housing was developed by the mid-sixties. The exception to this trend was approximately 80 units in several projects approved in 1971 (the 788 unit Diablo Keys and another 158 unit project are within two-thirds of a mile, but not within 1,500 feet of the station).[59]

According to key informants, BART may have caused residential rehabilitation activity north of the station to decline as owners hold property in expectation of increased land values and opportunities for higher density development.

Impacts on Property Acquisition and Occupancy (Speculation) — Speculation in offices and commercial properties occurred around the Walnut Creek BART station, beginning with BART construction and peaking one year after service began in 1973. North of the station, homeowners have formed a cartel in the "Golden Triangle" area, for the purpose of restricting land supply in order to obtain eventually a higher price for their property. The Walnut Creek Plaza Building was built on land purchased for speculation; it changed hands several times before being acquired by the Dillingham Corporation, and prices rose from $3.50 per square foot to $5.30 per square foot.

Impacts on Property Prices and Rents — Regression analyses of trends in residential property prices in the vicinity of the Walnut Creek BART station suggest that the expectation of BART service had a positive effect on surrounding

58. John Blayney Associates/David M. Dornbusch & Co., Inc., Study of the Housing Industry, p. 25.

59. Ibid. p. 34.

property prices (from before construction to during construction). Analysis of changes in real property prices from before construction to after service began suggests that BART may have shifted to a negative influence after the opening of service. There has been an overflow of parked cars in surrounding neighborhoods as the Walnut Creek BART parking lot is insufficient for demand, and this annoyance may be offsetting any perceived gain from accessibility to the station. The BART tracks had a small negative impact, but smaller than anticipated and over a very narrow belt along the tracks.

Station proximity has had no discernible effect on residential rents, although there is some evidence that this might be changing now. However, BART may have had a minor positive effect on commercial rents between 1974 and 1978 (in combination with several other interrelated variables). This confirms impacts on commercial rents in San Francisco and Oakland, where BART had no effects prior to service, but station proximity has affected rents since 1972.

Other Impacts -- Feeder service is provided from Rossmoor (an 8,000 resident "adult community") to the BART station and downtown Walnut Creek, but ridership among Rossmoor residents is low (about 75 daily BART riders -- half the feeder bus patronage). However, the shuttle service is a selling point for this highly successful, upper income retirement community. BART offers potential mobility to those Rossmoor residents who are non-drivers.

BART appears to improve the mobility of Walnut Creek youth by offering opportunities for greater travel, family visits, lessons, and recreational and cultural trips. Most of the youth interviewed reported that other family members use BART as well, suggesting that there is a process of reinforcement within the family encouraging BART use among all members.[60]

Indirect Environmental Effects -- With the exception of the Walnut Creek Plaza building, all BART-induced development in Walnut Creek was compatible with earlier development patterns. The parking shortage associated with the Walnut Creek Plaza building should drop with completion of a new parking structure.

BART's Facilities and Operation

Environmental Impacts -- Environmental impacts caused by BART are minimal, and possible acoustic and atmospheric impacts are masked by impacts from an adjacent freeway. No natural habitats (vegetation, animal life) are present in the station site area. Visually, the station is compatible in scale to the adjoining

60. Jefferson Associates, Inc., Three Community Case Studies: Impacts of BART on Institutions and Lifestyles, pp. 54-58.

freeway and 10 story office building. Parking lot overflow is causing some congestion and annoyance to the nearby residents. There are plans for adding spaces by decking part of the station lot, but no date has been set for implementation.[61]

Rapid growth in the City's population over the past 16 years and location near the interchange of a major freeway have increased traffic congestion near the BART station. The City's Core Area Plan, if implemented, could add 2.5 million square feet of office and retail development and more than 1,000 apartment units. This would have substantial environmental effects, but the extent to which BART contributes, directly or indirectly, to these impacts is a function of its effects on growth and station area development. No analysis of BART's role in implementation of the Core Area Plan was undertaken.

FREMONT

Setting and Chronology

Since incorporation in 1956 the City of Fremont has grown rapidly, from 44,000 persons in 1960 to approximately 101,000 in 1970 and 117,000 in 1977, and in the process transformed from a rural farming community to one of the fastest growing Bay Area cities. Fremont, located about 25 miles southeast of Oakland along the eastern shore of San Francisco Bay, is the southernmost town of Alameda County. Unlike Walnut Creek where there are few remaining undeveloped areas, Fremont with 96 square miles (almost twice the area of San Francisco) has substantial vacant buildable land, and while growth has been substantial, its current population is only about half of that projected in the early 1960s.[62] The City has freeway access both to Oakland and San Francisco to the north (although congestion makes it a long journey) and to San Jose, located 15 miles to the south. The dramatic employment growth of San Jose and the south peninsula across the Bay also have been important factors in Fremont's growth. Fremont is governed by a weak mayor-council form of government, with a tradition of strong professional city management and planning.

In comparison with Walnut Creek, Fremont has a lower median family income, (median family income in 1969 of $12,700 compared to $14,600 in Walnut Creek), and has had more characteristics of a blue collar suburban community. It is the location of a General Motors assembly plant, and there are other substantial industrial employers. A higher proportion of Fremont household heads are employed in Fremont (26.5 percent), compared to eight percent of Walnut Creek household heads employed locally, and there is a much lower proportion of central city commuters, with only five percent of Fremont workers (household heads) employed in San Francisco compared to 27 percent in Walnut Creek.[63]

61. Gruen Associates, Inc., Environmental Impact Project Case Studies, p. 16.

62. Booz, Allen & Hamilton, Inc., Case Study Orientation, p. 49.

63. California Department of Finance, Contra Costa County and Fremont Special Censuses, 1974 and 1975.

BLANK PAGE

BLANK PAGE

TABLE 15. MAJOR MILESTONES IN THE FREMONT CASE STUDY AREA, 1962-78.

BART Planning, Construction and Operation	Year	Public Action	Major Station Area Land Use Changes
BART bond issue approved	1962		
	1964	Special Station Location Study Committee formed	
	1966		
Present station location adopted			
	1968	Highway 17 widened; General Plan 1965-67 adopted General Plan amended to extend CBD to include BART station. Tri City Transit System Study undertaken	Fremont Fashion Center opened
Station construction begins	1970		
Station completed			
Interim service begins	1972	Tri City Transit System funding defeated BART Station Area Study initiated; BART Citizens Advisory Committee formed	Alameda County Courthouse planned
Transbay service begins	1974	General Plan amendment allowing high density station area housing proposed; Annexation to A/C Transit District approved; General Plan amendment allowing high density station area housing adopted	
	1976		Alameda County Courthouse construction begins; Fremont location selected for the California Schools for the Deaf and Blind; Alameda County Courthouse completed
Night service begins			
Saturday service begins	1978		

The Fremont station location was modified slightly in 1965, and much of the land around the station remains vacant. Station construction started in June 1970, and it only took 18 months to build the surface level station. BART service to Oakland began in September 1972, the first segment of the system to open. Major milestones are summarized in Table 15.

BART's Organization, Planning, and Publicity

Coordination: Station and Route Location, Planning, and Design -- No formal organizational changes were made by the City to negotiate BART-related issues. The Fremont Chamber of Commerce established a special committee in 1964 to evaluate alternative route and site locations, but in general there were few issues generating widespread concern or requiring action outside the established local governmental framework. This is due largely to the location of the station and line in predominantly undeveloped areas without the problems of relocation, street closures, or disruption of existing urban patterns. The main issue in Fremont was provision of service -- originally not planned for the initial construction phase.[64]

Impacts on Planning and Zoning -- Following route alignment and station location decisions, the first BART-related planning change was the 1969 general plan amendment, extending the commercial district to the BART station area and recommending medium density residential development around the station -- a one mile area. A more specific general plan amendment was adopted in 1974 for the stated purpose of "increasing the number of residential units within walking distance of the station". The holding capacity was increased from 5,500 to 7,200 units, requiring densities of 50 to 70 dwelling units per acre around the station. The changes are illustrated on the pre- and post-BART General Plan maps.

However, these General Plan recommendations have not been translated into area-wide rezoning of the central core (see zoning maps), and most of the station area still is zoned for agriculture. Although the General Plan encourages intensive retail commercial and residential development, specifically calling for high density, multi-storied buildings, no development at these greater densities has occurred within the station area, although one is in the planning stage.

Impacts on Local Government Expenditures -- All major BART-related improvements in Fremont were consistent with capital improvement objectives established independently of BART. Two major capital improvements attributable to BART were a grade separation (BART and the Western Pacific Railroad) and the station access road (BART Way) from Civic Center Drive. Street improvements in the vicinity of the BART station were designed to improve access to the

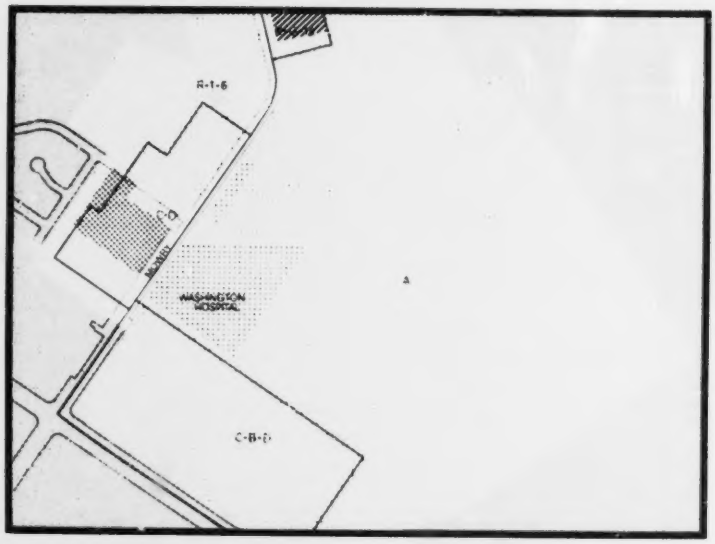
64. McDonald and Smart, A History of the Key Decision in the Development of Bay Area Rapid Transit(BART) (Berkeley: BART Impact Program Final Report), August 1975.

FREMONT STUDY AREA MAPS

84A

FREMONT STATION AREA
1965 PRE-BART LAND USE AND ZONING

North
300' 600' 900'



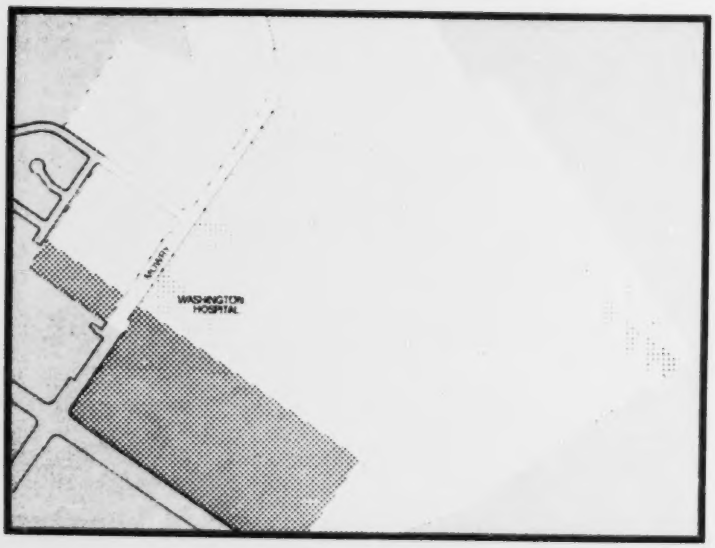
LAND USE

- Single Family Residential
- Multi-Family Residential
- Commercial and Office
- Public and Institutional
- Agricultural
- Vacant

1965 ZONING

R-1-6	Single Family Residential
R-G-15	Garden Apartment Residential
C-O	Commercial Office
C-B-D	Central Business
A	Agricultural

1962 GENERAL PLAN



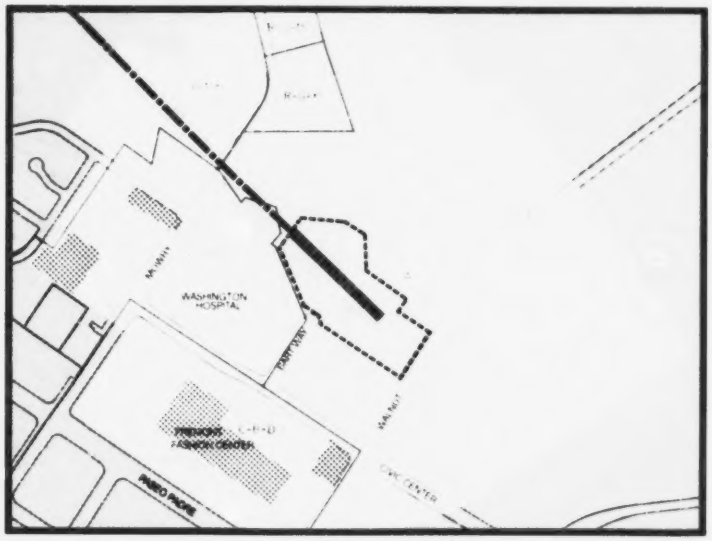
1962 GENERAL PLAN

- Low Residential
- Agricultural
- Professional Administrative

84B

FREMONT STATION AREA
1965-77 LAND USE CHANGES AND ZONING

North
300 600 900



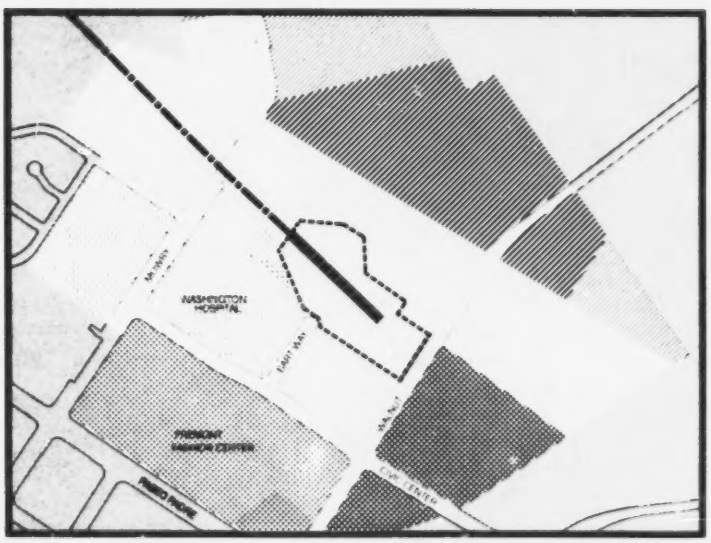
BART
- Station Platform
- Parking
- Subway Line
- Surface Line
- Aerial Line

LAND USE
- Commercial and Office
- Vacant
- Parking

1977 ZONING

R-1-6	Single Family Residential
R-G-15	Garden Apartment Residential
R-G-X	Garden Apartment Residential
C-O	Commercial Office
C-B-D	Central Business
A	Agricultural

1977 GENERAL PLAN



1977 GENERAL PLAN
- Low Residential
- Medium Residential
- Very High Residential
- Office Commercial
- Retail Commercial
- Institutional
- Activity Corridor
- Transportation Center

84C

central business district. The City has requested that BART provide additional parking to meet the present overflow problem. BART had a minimal impact on Fremont's budget, although it was a partial factor in initiating $1 million in improvements.[65]

BART's Construction Process

BART's Property Acquisition -- In Fremont BART purchased 88.9 acres, nearly all of which (85.3 acres) was required for its facilities. Only 3.6 acres were termed surplus, and one-third of this land was sold by November 1977, mainly to adjacent property owners. Residential displacement was minimal (six housing units).

Construction Impacts — As with most of the suburban station areas, little or no adverse construction impacts on retail sales, property acquisition, rehabilitation or maintenance occurred because BART was built on open land alongside an existing transportation corridor, the Western Pacific Railroad.

Environmental Impacts -- Unlike many other suburban BART stations, the Fremont station is in an area of sparse development and has no housing in its immediate vicinity. During the relatively short (one and one-half years) construction period, it is possible that patients and staff of the nearby Washington Hospital experienced some impacts (noise, dust, dirt, etc.), but no records of complaints are available. In the Fremont area heavy rains the first two years following construction of BART trackway embankments caused severe erosion and gullying of the embankments. The problem was solved with ground cover planting. One other construction impact on the natural environment in this area was the relocation of a pond in order to expand the station's parking lot. This was done in 1976, and according to BART officials there was no damage to the resident wildlife.[66]

BART's Transportation Service

Impact on Travel Behavior -- BART offers Fremont residents the greatest improvement in accessibility to downtown San Francisco and Oakland among the end-of-the-line communities served. In comparison with the NBA, average peak hour transit trip times are reduced 48 minutes to Oakland (53 versus 101 minutes) and 59 minutes to downtown San Francisco (61 versus 120 minutes). These large

65. Booz, Allen & Hamilton, Inc., The Impact of BART on Local Government Expenditures, Revenues, and Financial Policy, p. 17.

66. Gruen Associates, Inc., Environmenal Impact Project Case Studies, p. 18.

differences are a result of no direct transit service to Oakland and San Francisco from Fremont prior to BART. However, relatively few Fremont residents work in downtown San Francisco and downtown Oakland (5 percent of Fremont household heads worked in San Francisco in 1975 versus 27 percent in Walnut Creek); thus, when actual trip patterns to all destinations are taken into account, BART's impact on the mobility of Fremont residents is far lower than suggested by San Francisco trip times. Average trip times with BART are only seven minutes less than under the NBA assumption, a 7 percent saving.[67]

In March 1978, about 4,000 daily BART trips started or ended at the Fremont station. Figure 5 gives the patronage history of the Fremont station. For all trips ending at the Fremont station, 11 percent originate from downtown Oakland, 50 percent start from other East Bay stations, 36 percent start from downtown San Francisco, and 3 percent start from other West Bay stations. In 1976, about 64 percent of all the trips that started from the station were work-oriented, and an additional 10 percent were for shopping and other personal business.

A 1976 socio-economic profile of Fremont BART users showed more males (54 percent) than females (46 percent). A large majority (80 percent) of users were white, 8 percent were black, 7 percent were Asian, and the remaining 5 percent were mostly Spanish heritage. In comparison with Fremont population, blacks and Asian BART users are over-represented and Spanish heritage under-represented. About 36 percent of the users had four or more years of college, and 62 percent had family incomes over $15,000 in 1976.[68]

Of work trips by heads of households in Fremont in October 1974, 3.2 percent were on BART, ranging from .2 percent of trips to other Fremont destinations to 15 percent of Oakland-Alameda-Berkeley work trips, and 22 percent of San Francisco work trips. BART patronage differs by ethnic status among Fremont residents. Only 1.9 percent of Spanish heritage household heads commute by BART, and the proportions are 3.4 percent for whites, 5.7 percent for blacks, and 4.7 percent for Asians. These differences seem to be a result of different trends in work location by ethnic status among Fremont residents, not different attitudes toward BART. For example 17 percent of black Fremont household heads worked in Oakland-Alameda-Berkeley, while only 10 percent of whites worked in those cities.

While the 1974 black population of Fremont was very low (1.3 percent), this was a fourfold increase in four years, and it appears possible that the higher propensity to work in central cities among Fremont blacks may indicate a BART influence in their locational decisions. (Confirmation of this finding would require further research since black Fremont households were not surveyed in the study of BART's effects on households' location decisions.)

67. John Blayney Associates/David M. Dornbusch & Co., Inc., Accessibility Mapping.

68. Peat, Marwick, Mitchell & Co., Inc., Travel Data for BART Station Area Case Studies.

The Fremont BART station has five connecting bus lines with an average headway of 30 minutes. Approximately 18 percent of BART patrons use this mode for trips to the station. The 735 parking spaces originally constructed by BART have not met the demand. By 8:00 AM, all the BART parking spaces are occupied, but park-and-riders can find additional free parking adjacent to the station property. The station parking lot is being expanded by 361 spaces, so parking on surrounding streets should diminish somewhat. About 63 percent of BART users drive or carpool to the station (the 12 percent carpooling is the highest proportion for any BART station), 12 percent are dropped off, and only 6 percent walk or ride bicycles to the station.

Impacts on Office Construction -- Overall, Fremont's share of the office construction in the three-county BART service area has not increased. Within the Fremont Civic Center, six-tenths of a mile southeast of the BART station, there has been a reasonably steady stream of office construction since the early 1960s, accounting for about a third of the value of Fremont's office construction. Much of this is more directly attributable to the presence of Washington Hospital than to BART. (Until recently, for example, the largest new office building in the area was a $1.4 million medical building adjacent to the hospital. There has been no apparent change in the office construction rate measured in terms of permit value for the past 18 years.)

However, according to informants, BART did affect the decision to build the new Alameda County courthouse on a site four-tenths of a mile from the BART station. With plenty of vacant land available, the courthouse eventually may attract related office activity to the station area.[69]

Employers' and Workers' Location Decision - No major employers have recently located in the Fremont area. At the large General Motors plant located several miles south of the BART station, swing shift employees cannot use BART because of their hours. As the Fremont station serves as an origin station (63 percent of station exits are between 4:00 PM and 8:00 PM), one would expect few employers' decisions to be influenced by BART.

Impacts on Retail Sales -- Key informants were not aware of any retail stores locating in Fremont because of BART, but apparently the Montgomery Wards location in Fremont Fashion Plaza (adjacent to the Fremont BART station) was selected in part because it was felt that BART would enlarge its trade area boundaries. On the other hand, informants believe that BART takes more shoppers out of Fremont than it brings in. For example, one informant suggested that business in the Fremont Capwell's has declined because former customers are now shopping at Capwell's in Oakland. Regression analysis of actual sales data in Fremont, however, did not detect any BART effect.

69. John Blayney Associates/David M Dornbusch & Co. Inc., Study of the Office Construction Industry, p. 19.

Impacts on Households' Location Decisions -- This was not studied for the Fremont area, but the effects would be expected to be somewhat similar but lesser in magnitude than in Walnut Creek. Fremont's lower central city work orientation suggests that a smaller proportion of in-migrants would have considered BART an important locational factor. Lower house prices and greater availability of homes may increase BART's influence in the future.

Impacts on Housing Construction and Rehabilitation — Although key informants could not identify any specific project built to date that is attributable either directly or indirectly to BART, analysis of building permit data and changes in commuter orientation of Fremont residents suggests that, without BART, some San Francisco and Oakland workers would not have sought housing in Fremont. Key informants indicated that there was a perceived BART-related demand as a result of Fremont's location between the employment centers of Santa Clara County and San Francisco/Oakland, thus allowing one spouse of a dual worker household to drive south while the other takes BART north.

The minimum density floor of 50 units per acre imposed by the Fremont General Plan has apparently prevented station area residential construction to date, but a development plan for a 712 unit condominium complex within 1,000 feet of the station was approved in December 1977. The City would not approve the developer's request for a density reduction, but did reduce the parking requirements in return for offsite construction by the developer of a bicycle and pedestrian path to the station. If this project goes ahead, it will be the largest clearly BART-induced housing project in a station area.

As there is no station area housing in Fremont, housing rehabilitation was not studied.

Impacts on Property Acquisition and Occupancy (Speculation) — No BART-related speculation was found in the Fremont station area. The City's General Plan designates land within one-half mile of the station as high density residential use, but the market for such housing has not been strong in recent years. Only in December 1977 did a prospective developer exercise an option for a 14.2 acre parcel 1,000 feet northeast of the station on which he proposes to construct a 712 unit project. An eight acre site next to the station has been on the market for four or five years, and although there is probably not a fixed asking price for the property (and thus it is not over-priced), there have been no offers to buy it.

Impacts on Property Prices and Rents — This was not specifically studied in Fremont, but analysis of recent sales around the South Hayward station suggests BART is having a positive effect on southern Alameda County property values.

BART's Facilities and Operations

Environmental Impacts — Extensive overflow parking (estimated to be over 500 cars) occurs at the Fremont station. However, for the most part the spill-

over is into undeveloped areas, currently causing no impact other than inconvenience to the BART patron. Some cars do park in a nearby regional shopping center lot, and store owners have complained of the problem. BART train noise levels are somewhat higher (two to three decibels) than the ambient community levels along the embanked trackway coming into the Fremont station, but this difference probably is not perceptible. BART train noise has apparently deterred residential development on lands adjacent to the tracks in a narrow corridor stretching several miles north of the Fremont station, and several homes in this area are negatively affected by train noise. The visual scale of the BART station and its parking lot is similar to or smaller than those of the nearby shopping center and hospital.[70]

SIMILARITIES AND DIFFERENCES

Fremont is a less central city-oriented community, and a higher proportion of residents work locally than in Walnut Creek. Fremont has an industrial base of employment (replacing agricultural employment), with population-serving retail. Walnut Creek has some sub-regional office and retail facilities. In extent of development, Fremont is about 10 years behind Walnut Creek in terms of build-out (see Table 16 for a summary of 1965-77 land use changes). While BART construction had little impact in either community, few persons were dislocated in Fremont, and 170 homes were taken by BART acquisition in Walnut Creek. Socio-economic characteristics of BART patrons of the two stations are compared in Table 17.

BART has had more impacts on land use in Walnut Creek than Fremont to date, but this may change as Fremont still has significant amounts of vacant buildable land in the station area.

- BART has been incorporated into the central district plans of each community as one element of a multi-purpose central commercial and residential area, but not as a focal point. The business community was active in station location decisions in both communities. However, Walnut Creek residents and property owners have been more active than their Fremont counterparts in station area planning in recent years, as traffic and high-rise development have become issues.

- Both communities adopted policies to encourage transit-oriented development, although Walnut Creek subsequently modified its policies to place certain limits on station area densities. (Reduced parking requirements for high-rise office construction have been eliminated in Walnut Creek, but an open mixed use zone with no fixed density still adjoins the station.) In Fremont, the minimum density residential district (50 units per acre) has deterred development to date, as developers have not felt there was a viable demand

70. Gruen Associates, Inc., Environmental Impact Project Case Studies, p. 18.

TABLE 16. SUBURBAN CASE STUDY AREAS:
SUMMARY OF 1965-77 STATION AREA LAND USE CHANGES[a]

New Construction	Walnut Creek	Fremont
Single Family Residential (Units)	9	—
Multi-Family Residential (Units)	200	—
Office (Square Feet)	196,000	75,000
Retail Commercial (Square Feet)	160,000	500,000
Other Commercial (Acres)[b]	1.0	—
Institutional and Government (Acres)	0.3	8.6
Parking (Acres)[c]	0.4	—
Demolition — No Redevelopment (Acres)		
Residential	1.9	1.0
Non-Residential	0.2	.5
Total	2.1	1.5

a. Station area includes all land within 1,500 feet of a BART station.
b. Includes such commercial uses as service stations and automobile repair shops.
c. Includes only land solely devoted to parking; all other land uses for parking is assigned to the principal use category, commercial or office, industrial, etc. that parking serves.

Source: John Blayney Associates

BLANK PAGE

BLANK PAGE

TABLE 17. CHARACTERISTICS OF BART USERS — TRIPS ORIGINATING IN THE SUBURBAN CASE STUDY AREAS

	Walnut Creek	Fremont
Daily BART Patronage (Trips - March 1978)	3,800	3,900
Income: Percent Earning Over $15,000 in 1976	67.7	62.1
Median Age	36	33
Education: Percent with Four or More Years College	51.1	35.8
Sex: Percent Male	56.0	53.6
Ethnic Status (Percent Distribution)		
— Black	2.0	7.4
— Spanish Heritage	1.7	3.9
— Asian	3.9	7.1
Median Trip Time (Minutes)	59	68
Work Trips: Percent of Total Trips	75.9	63.6

Source: 1976 BART Passenger Profile Survey

for such high density housing in Fremont. These strategies may be good long-term mechanisms for assuring transit-oriented development, but they have not encouraged station area investment in the short run, particularly in Fremont.

- Both stations are primarily origin stations, and work trips to Oakland and San Francisco are the leading destinations from both stations. Consequently, BART should not be expected to attract significant transit-related development to the suburban business districts until travel patterns change significantly. Although the first round of BART-related land use impacts included the Walnut Creek Plaza office building and some influence on the Fremont Fashion Center, BART apparently has not affected rentals or sales at these facilities. Proximity of commercial facilities to BART in the suburban areas has not reduced parking demand, leaving locational visibility as the main attraction for the developer. Location of an Alameda County courthouse near the Fremont station (approximately one-half mile) suggests that public agencies want to maximize use of BART, but its function as a sub-regional courthouse also raises the possibility that few trips to it (with the exception of interoffice county travel) will be well served by BART.

- Although a significant proportion of new shoppers in Walnut Creek indicated BART influenced their decisions to shop there, retailers and government officials in both cities feel that, on balance, BART takes more retail sales away than it brings in (local residents using BART to shop in San Francisco or Oakland). However, no statistical evidence supports this conclusion.

- BART-influenced residential development has been located beyond walking distance of the stations. In Walnut Creek, lack of large vacant parcels near the station, high costs for redevelopment, a cartel which is limiting the supply, and a high traffic, noisy environment (a freeway and freeway entrance and exit adjoin the station) have precluded station area housing development. In Fremont, lack of demand (at least perceived, as it has not been tested) for high density housing has not justified station area development to date.

- Both stations are predominantly park-and-ride facilities serving populations more auto-oriented than inner city or urban residential stations. Both stations have insufficient parking lot capacity. There is only minimal transit and feeder bus service, but even this level is greater than would be expected in the absence of BART.

Gains and Losses

In Walnut Creek, many residents benefit directly or indirectly from BART service. Many use the system to commute to San Francisco and Oakland; others were influenced by BART in their residential location decisions but are not yet riding the system. Residents of the San Ramon Valley also benefit from BART service. Developers of projects adjacent to BART appear to gain by increased visibility of their projects, but several developers seemed to suffer a short term loss by attributing too great expectations to BART (projects not filling up as fast as expected). Households displaced by BART generally received relocation

payments, and thus may not have been adversely affected. Current residents close by the station may be negatively affected by traffic and noise associated with the property, and they apparently have not benefitted from any increases in property prices as a result of station proximity. Some Walnut Creek merchants perceive that retail sales may have been lost to San Francisco and Oakland as a result of BART service.

In Fremont, again BART users have been the greatest gainers, as have been BART users from Santa Clara County who use the Fremont station. There have been no negative effects on surrounding property owners as little of it currently is developed for urban use. A few homes north of the station adjoining the BART tracks are exposed to higher ambient noise levels because of BART. Merchants in Fremont also perceive that sales were lost to Oakland as a result of BART service.

POLICY IMPLICATIONS

In planning other transit systems, several things can be learned from the BART experience in the suburban case study areas. While there was some initial land speculation in anticipation of BART service, this did not continue once service was initiated, and BART proximity does not appear to be perceived as a particular benefit, especially for residents.

BART serves few trips well in Fremont and Walnut Creek, mostly those commute trips from the suburban communities to San Francisco and Oakland. Some shopping and other personal business trips to those destinations are also served. Most households' decisions to move into a suburban community were not affected by BART, but some suburban residents were influenced in their choice of a particular suburban community by the availability of BART service.

Development of housing does not appear attracted to the suburban station areas with large park-and-ride facilities. Housing projects in Walnut Creek affected by BART were all beyond walking distance of the station, and most suburban households do not seem to place a high value on walking proximity to BART. In fact, parking lot overflow at the Walnut Creek station has caused considerable dissatisfaction among residents and neighborhood merchants whose properties are affected (and may have the same effect in Fremont when the station area is built up). Other cities should develop contingency plans for similar situations. Options would include (1) initially allocating additional space beyond the forecasted need, to be maintained in interim use until such time as it may be needed for parking facilities, or (2) coordinating shuttle feeder buses more closely with other transit systems and local authorities so that complaints can be responded to by increasing or improving feeder service, possibly in conjunction with disincentives or restrictions for on-street parking. Large park-and-ride stations probably should be located adjacent to highways or freeways to facilitate access. (This is particularly important for stations with end-of-the-line characteristics serving large geographic areas.)

Major retail uses probably are not warranted in outlying suburban station areas. Their trade area is not accessible by BART, and the possibility of combination shopping — work trips on the way home from the station would not seem to be sufficient to warrant the location. Office uses that may generate interoffice, mid-day travel, and higher density housing uses would be more logical uses within station areas because they could increase walk-in patronage.

Private redevelopment in suburban areas does not occur easily, particularly if small parcel sizes create assembly problems. In selecting suburban station areas in which the goal is development of higher density uses in an already developed area, supportive land use policies (density bonuses or special allowances in relation to other sites) and possibly public redevelopment are necessary to achieve the goals of higher density uses.

BIBLIOGRAPHY

BART Impact Program Documents

Booz, Allen & Hamilton, Inc. Case Study Orientation. BART Impact Program Working Note, Berkeley, California, April 1977.

Booz, Allen & Hamilton, Inc. The Impact of BART on Governmental Structure, Organization and Operations. BART Impact Program Working Paper, Berkeley, California, June 1977 (draft).

Booz, Allen & Hamilton, Inc. The Impact of BART on Land Use and Development Policy. BART Impact Program Working Paper, Berkeley, California, September 1977 (revised draft, March 1978).

Booz, Allen & Hamilton, Inc. The Impact of BART on Local Government Expenditures, Revenues, and Financial Policies. BART Impact Program Working Paper, Berkeley, California, July 1977 (draft).

Booz, Allen & Hamilton, Inc. The Impact of BART on Local Transit Service and Financial Policy. BART Impact Program Working Paper, Berkeley, California, September 1977 (draft).

Booz, Allen & Hamilton, Inc. The Impact of BART on Public Policy. BART Impact Program Working Paper, Berkeley, California, December 1977.

Booz, Allen & Hamilton, Inc. The Impact of BART on State Highway Plans and Policies. BART Impact Program Working Paper, Berkeley, California, June 1977 (draft).

Curtis Associates; Booz, Allen & Hamilton, Inc. Decision History. BART Impact Program Working Note, Berkeley, California, May 1977.

DeLeuw, Cather & Company. Impacts of BART on the Natural Environment: Interim Service Findings. BART Impact Program Technical Memorandum, Berkeley, California, March 1976.

DeLeuw, Cather & Company. Responses of Nearby Residents to BART's Environmental Impacts. BART Impact Program Technical Memorandum, Berkeley, California, January 1977.

DeLeuw, Cather & Company. The Environmental Impacts of BART: The User's Experience. BART Impact Program Technical Memorandum, Berkeley, California, July 1977.

Gruen Associates, Inc. A Description of BART: Its Facilities, Service, and Surroundings. BART Impact Program Working Paper, Berkeley, California, December 1977.

Gruen Associates, Inc. Environmental Impact Project Case Studies. BART Impact Program Working Note, Berkeley, California, September 1977.

Gruen Associates, Inc. Impacts of BART on Visual Quality: Interim Service Findings. BART Impact Program Technical Memorandum, Berkeley, California, March 1976.

Gruen Associates, Inc. Indirect Environmental Impacts of BART. BART Impact Program Technical Memorandum, Berkeley, California, July 1977.

Gruen Associates, Inc. and DeLeuw, Cather & Company. Environmental Impacts of BART. BART Impact Program Working Paper, Berkeley, California, July 1977.

Gruen Associates, Inc. and DeLeuw, Cather & Company. Environmental Impacts of BART: Interim Service Findings. BART Impact Program Final Report, Berkeley, California, January 1976.

Gruen Associates, Inc. and DeLeuw, Cather & Company. Impacts of BART on the Social Environment: Interim Service Findings. BART Impact Program Technical Memorandum, Berkeley, California, March 1976.

Jefferson Associates, Inc. Impacts of BART on Bay Area Institutions of Higher Education and Their Students. BART Impact Program Technical Memorandum, Berkeley, California, May 1977.

Jefferson Associates, Inc. Impacts of BART on Bay Area Political Institutions. BART Impact Program Technical Memorandum, Berkeley, California, May 1977.

Jefferson Associates, Inc. Impacts of BART on Travel by Ethnic Minority and Physically Disabled Persons. BART Impact Program Technical Memorandum, Berkeley, California, May 1977.

Jefferson Associates, Inc. Impacts of the Bay Area Rapid Transit System on Health Care Institutions. BART Impact Program Technical Memorandum, Berkeley, California, March 1977.

Jefferson Associates, Inc. Three Community Case Studies: Impacts of the Bay Area Rapid Transit System on Institutions and Life Styles. BART Impact Program Working Note, Berkeley, California, August 1977.

John Blayney Associates/David M. Dornbusch & Co., Inc. Accessibility Mapping. BART Impact Program Working Paper, Berkeley, California, September 1977.

John Blayney Associates/David M. Dornbusch & Co., Inc. Methodology: Study of Development Patterns and Program-Wide Case Studies. BART Impact Program Working Note, Berkeley, California, July 1977.

John Blayney Associates/David M. Dornbusch & Co., Inc. Station Area Land Use. BART Impact Program Working Paper, Berkeley, California, November 1977.

John Blayney Associates/David M. Dornbusch & Co., Inc. Study of BART's Consumption of Land and Property. BART Impact Program Working Paper, Berkeley, California, March 1977.

John Blayney Associates/David M. Dornbusch & Co., Inc. Study of BART's Construction Impacts. BART Impact Program Working Paper, Berkeley, California, April 1978.

John Blayney Associates/David M. Dornbusch & Co., Inc. Study of Development Patterns. BART Impact Program Working Paper, Berkeley, California, June 1978.

John Blayney Associates/David M. Dornbusch & Co., Inc. Study of Employers' Location Decisions. BART Impact Program Working Paper, Berkeley, California, March 1978.

John Blayney Associates/David M. Dornbusch & Co., Inc. Study of Households' Location Decisions. BART Impact Program Working Paper, Berkeley, California, February 1978.

John Blayney Associates/David M. Dornbusch & Co., Inc. Study of Property Acquisition and Occupancy: BART's Effects on Speculation. BART Impact Program Working Paper, Berkeley, California, April 1978.

John Blayney Associates/David M. Dornbusch & Co., Inc. Study of Property Prices and Rents. BART Impact Program Working Paper, Berkeley, California, July 1978.

John Blayney Associates/David M. Dornbusch & Co., Inc. Study of Retail Sales and Services. BART Impact Program Working Paper, Berkeley, California, April 1978.

John Blayney Associates/David M. Dornbusch & Co., Inc. Study of the Housing Industry. BART Impact Program Working Paper, Berkeley, California, September 1977 (revised April 1978).

John Blayney Associates/David M. Dornbusch & Co., Inc. Study of the Office Construction Industry. BART Impact Program Working Paper, Berkeley, California, August 1977.

John Blayney Associates/David M. Dornbusch & Co., Inc. Study of Workers' Location Decisions. BART Impact Program Working Paper, Berkeley, California, November 1977 (revised March 1978).

McDonald & Grefe, Inc. The Impact of BART on the Competitive Advantage and Efficiency of Bay Area Business Operators. BART Impact Program Technical Memorandum, Berkeley, California, August 1977.

McDonald and Smart. A History of the Key Decisions in the Development of Bay Area Rapid Transit (BART). BART Impact Program Final Report, Berkeley, California, August 1975.

Metropolitan Transportation Commission. Policy-Oriented Case Studies. BART Impact Program Working Memorandum, Berkeley, California, February 1977.

Metropolitan Transportation Commission. The Bay Area Rapid Transit System: Current Status and Impacts. BART Impact Program Working Paper, Berkeley, California, August 1975.

Peat, Marwick, Mitchell & Co. Analysis of 1977 Workplace Survey. BART Impact Program Working Note, Berkeley, California, December 1977.

Peat, Marwick, Mitchell & Co. BART's First Five Years: Transportation and Travel Impacts Summary and Conclusions. BART Impact Program Working Paper, Berkeley, California, April 1978.

Peat, Marwick, Mitchell & Co. BART Impacts on Highway Traffic and Transit Ridership. BART Impact Program Technical Memorandum, Berkeley, California, May 1975.

Peat, Marwick, Mitchell & Co. BART Station Access Case Studies. BART Impact Program Working Note, Berkeley, California, April 1977.

Peat, Marwick, Mitchell & Co. BART Station Area Case Studies. BART Impact Program Working Note, Berkeley, California, 1977.

Peat, Marwick, Mitchell & Co. Demography of Areas Served by BART. BART Impact Program Working Note, Berkeley, California, October 1977.

Peat, Marwick, Mitchell & Co. Immediate Travel Impacts of Transbay BART. BART Impact Program Technical Memorandum, Berkeley, California, May 1975.

Peat, Marwick, Mitchell & Co. Transportation and Travel Impacts of BART: Interim Service Findings. BART Impact Program Final Report, Berkeley, California, April 1976.

Peat, Marwick, Mitchell & Co. Travel Data for BART Station Area Case Studies. BART Impact Program Working Note, Berkeley, California, May 1977.

Peat, Marwick, Mitchell & Co. Travel in the BART Service Area. BART Impact Program Working Paper, Berkeley, California, September 1977.

Skaburskis, Andrejs. The Impacts of BART on Property Values: A Case Study of the Rockridge Neighborhood. BART Impact Program Working Paper, Berkeley, California, January 1976.

TRW, Inc. Impacts of BART on Air Quality: Interim Service Findings. BART Impact Program Working Paper, Berkeley, California, March 1976.

Urban Dynamics Associates. Implications of BART's Environmental Impacts for the Transportation Disadvantaged. BART Impact Program Technical Memorandum, Berkeley, California, January 1978.

Urban Dynamics Associates. BART's Implications for the Transportation Disadvantaged: Integration and Reporting. BART Impact Program Final Report, Berkeley, California, March 1978.

Local Planning and Zoning Studies

Fremont City Planning Department, 1977. Development Regulations.

Fremont City Planning Department, 1978. General Plan and Summary Map.

Fremont City Planning Department, 1964. Zoning Map.

Fremont City Planning Department, 1977. Zoning Map.

Oakland City Planning Department, 1969. A Design Framework for Oakland: Proposals from the 701 Urban Design Study.

Oakland City Planning Department, 1974. Alternatives for Rockridge: A Study of the Rockridge BART Station Area.

Oakland City Planning Department, 1969. BART Impact: Five Oakland Station Areas.

Oakland City Planning Department, 1965. Central Business District Zoning.

Oakland City Planning Department, 1958. General Plan.

Oakland City Planning Department, 1960. Land Use: Central Business District Survey.

Oakland City Planning Department, 1978. Land Use Map.

Oakland City Planning Department, 1976. Oakland Policy Plan: A Component of the Comprehensive Plan.

Oakland City Planning Department, 1965. Zoning Map.

Oakland City Planning Department, 1970. Zoning Map.

Oakland City Planning Department, 1967. Zoning Regulations: Oakland Planning Code.

Oakland City Planning Department, 1977. Zoning Regulations: Oakland Planning Code.

Richmond City Planning Department, 1966. General Plan: A Guide to Community Development.

Richmond City Planning Department, 1965. Zoning Map.

Richmond City Planning Department, 1976. Zoning Ordinance.

San Francisco City Planning Department, 1974. City Planning Code: Part II, Ch. II of San Francisco Municipal Code.

San Francisco City Planning Department, 1972. The Comprehensive Plan: Residence.

San Francisco City Planning Department, 1972. The Comprehensive Plan: Transportation.

San Francisco City Planning Department, 1963. Downtown San Francisco: General Plan Proposals.

San Francisco City Planning Department, 1967. Downtown Zoning Study Proposals, Report of the Director to the City Planning Commission.

San Francisco City Planning Department, 1961. Land Use Survey.

San Francisco City Planning Department, 1970. Land Use Survey.

San Francisco City Planning Department, 1955. Modernizing Downtown San Francisco.

San Francisco City Planning Department, 1966. San Francisco Downtown Zoning Study: C-3 and Adjacent Districts, Working Paper No. 2.

San Francisco City Planning Department, 1966. San Francisco Downtown Zoning Study: C-3 and Adjacent Districts, Final Report.

San Francisco City Planning Department, 1977. San Francisco Redevelopment Program Summary of Project Data and Key Elements.

San Francisco City Planning Department, 1971. The Urban Design Plan for the Comprehensive Plan of San Francisco.

San Francisco City Planning Department, 1974. Zoning Map of the City and County of San Francisco, City Planning Code: Part II, Ch. II of San Francisco Municipal Code.

Walnut Creek City Planning Department, 1971. Basic Data Report: BART Station Area Study.

Walnut Creek City Planning Department, 1975. Core Area Plan.

Walnut Creek City Planning Department, 1961. General Plan.

Walnut Creek City Planning Department, 1972. General Plan: The Next Twenty Years.

Walnut Creek City Planning Department, 1959. Generalized Land Use Map.

Walnut Creek City Planning Department, 1975. Zoning Ordinance.

Walnut Creek City Planning Department, 1978. Zoning Ordinance.

Other Documents

Contra Costa County Planning Department, 1970. Land Use Survey.

Duncan and Jones, 1973. Walnut Creek BART Station Area Plan, Berkeley, California. Prepared for City of Walnut Creek.

Gruen Gruen + Associates, 1976. Analysis of the Economic Impacts of the Proposed Change in San Francisco Zoning, San Francisco, California.

Jacobs, J.H. and M.S. McGill, 1976. An Analysis of BART-related Joint Development, San Francisco, California.

Mission Housing Development Corporation, 1974. A Plan for the Inner Mission: Books 1 and 2, San Francisco, California.

Mission Planning Council, 1977. Sixteenth Street: A Neighborhood Study, San Francisco, California.

Skaburskis, A., 1976. The Rockridge BART Station's Land Use Impacts, Vancouver, British Columbia.

Wise Associates, 1962. Fremont General Plan, Washington, D.C. Prepared for the City of Fremont.

PARTICIPATING FIRMS

JOHN BLAYNEY ASSOCIATES, URBAN AND REGIONAL PLANNERS

John A. Blayney
Michael V. Dyett, Project Manager
Robert W. Glover
Michael H. Fajans
Margaret Gurdziel
Michael Hitchcock
Nancy R. Ranney
Catharine M. Way
Karen F. Hull

DAVID M. DORNBUSCH & COMPANY, INC.

David M. Dornbusch, Technical Director
Caj Falcke
James Merchant
Tory Gussman

HUMAN RESOURCES CORPORATION

Masato Inaba
Robert Pitts
Louise Stutsman

APPENDIX A. KEY INFORMANTS INTERVIEWED

DOWNTOWN SAN FRANCISCO

Category/Name	Title/Organization
Agency Directors	
Loren Smith	Division Chief, Department of General Services, Planning and Development
Rai Okamoto	Director, Planning Department
Other Public Officials/ Staff	
Charles Robinson	Manager, State Employment Development Dept.
Mr. Kirby	General Services Administration
Bankers	
Mr. Clements	Assistant Vice President, Location Planning, Bank of America
Harry Rhorer	Crocker National Bank
Businesspeople	
Joseph Shakespear	General Manager, Casualty Division, Aetna Life and Casualty Insurance Company
Bernard Averbuch	Executive Director, Market Street Development Project
Albert S. Samuels, Jr.	President, Market Street Development Project
Mr. Brouse	Shaklee Corporation
Francis Sitek	Standard Oil of California
Sharon deZordo	Market Street Development Project
Thomas Bjorndal	West Coast Life Insurance Company
W. Carl Brune, Jr.	Pacific Gas and Electric Company
Community Organizers	
Danny Miranda	Executive Director, Apprenticeship Opportunities Foundation
Developers	
Gerson Bakar	Gerson Bakar Associates
Realtors	
Bill Cole	Coldwell Banker
H.W. Ehlers	Milton Meyer & Company
Thomas Doherty	Thomas H. Doherty
Retailers	
Ben Farnham	The Emporium
William LeFevre	Woolworth's
Clarke Stone	Macy's

DOWNTOWN OAKLAND

Category/Name	Title/Organization
Agency Directors	
Norman Lind	Director, Planning Department
Juan Lopez	Director of Manpower, Manpower & Training
David Hoard	Director, Oakland Community Development Agency
Other Public Officials/Staff	
Burton Bangsberg	Office of Community Development
Michael Kaplan	City Architect, City Architectural Department
Tony Vegari	Assistant Director, Energy Resources Development Administration
Dale Odell	Oakland Community Development Agency
James Blyler	Planner, Community Development
Mr. Molten	U.S. Postal Service
Bankers	
William McGuire	Vice President/Branch Manager, Wells Fargo
Phillip Novack	Assistant Vice President, Fidelity Savings and Loan
Robert Anderson	Vice President, Chief Appraiser, Citizens' Savings and Loan
Peter Crosby	Vice President, United California Bank
Robert Wilmeth	Vice President, Branch Location, Crocker National Bank
Businesspeople	
Loren Simpson/ James Killoran	Pacific Telephone
Mary Widener	
Paul Varacalli	Executive Secretary, United Public Employees, Local 390
Kay Davee	Personnel Director, Aetna Life and Casualty
William Weir	Manager, Office Operations, Clorox Corporation
Edward Zwolenkiewiez	Building Director, Blue Cross
Community Organizers	
Patricia Hicks	Director, CETA Program, Bay Area Urban League
Oscar Perez	Deputy Director, Spanish Speaking Unity Council
Stephanie Swearingen	Oakland Citizens Committee for Urban Renewal
Design Professionals	
Noboru Nakamura	Architect/Planner, Van Bourg, Nakamura, Katsura, Karney, Inc.

Developers	
Douglas Salter	Project Director, Oakland City Center, for Grubb & Ellis
Harold Ellis	Grubb & Ellis Real Estate
Realtors	
Raymond Haymon	Industrial Salesman, Grubb & Ellis Brokerage
Other Real Estate	
Sister Caroline	Our Lady's Home for the Aged
Wilma Reisinger	Assistant Comptroller, City Center Tower
Connie Ferry	Property Management Association
Dene Ogden	Real Estate Appraiser
Orra Hyde	Vice President, National Accounts, Coldwell Banker
C.H. Martin	Supervisory Real Estate Appraiser
Retailers	
Jack Richardson	Chairman, Capwell's
Ed Skvarca	General Manager, Liberty House
Kenneth Stock	Vice President of Finance, Liberty House
William Van Wagner	Vice President, Personnel, Roos Atkins

MISSION DISTRICT

Category/Name	Title/Organization
Agency Directors	
Rai Okamoto	Director, Planning Department
Evelyn Vann	Manager, State Employment Development Department, Mission Street Office
Other Public Officials/Staff	
Mr. Devlin	Building Inspector
Red Kernan	San Francisco Redevelopment Agency
Patricia Salinas	San Francisco Planning Department
Lester Riggins	California General Services Administration
Bankers	
Elwood Hansen	Chairman of the Board, Bay View Federal Savings and Loan
Frank Shaw	Assistant Manager, Crocker National Bank
Russel Marinello	Regional Lending Officer, Bay View Federal Savings and Loan
Edward Montes	Vice President, Pan American Federal Savings and Loan

Businesspeople	
Mackey C. Salazar	Attorney, building owner
Juanita Del Carlo	Executive Director, Mission Hiring Hall
Community Organizers	
Lee Soto	Executive Director, Arriba Juntos
Toby Levine	Mission Planning Council
Design Professionals	
Martin DelCampo	DelCampo Associates
Developers	
John Bourne	Executive Director, Mission Housing Development
Ben Ramos	President, Mission Economic Development Association
Gloria Ramos	Architect, builder, contractor
Realtors	
June McEvoy	Sales Manager, Padilla Realty
Other Real Estate	
Louis McFarlane	Manager, Sylvester Apartments
Retailers	
Philo Holland	Director of Public Relations, Sears
Philip Hunter	Owner, Redlicks Furniture Store
Matt Vasquez	Owner, Vasquez Optical
George Rodriguez	President & Manager, Mi-Rancho Markets
William Teismann	Vice President, Koret of California
S. Tashjian	Owner, Tashjian Flowers and Gifts

RICHMOND

Category/Name	Title/Organization
Agency Directors	
Chuck Coleman	Director, Employee Relations, Western Program Service Center, Social Security Ad.
Lance Burris	Director, Richmond Redevelopment Agency
Ted Burton	Housing Director, Community Development
Chuck Woodward	Planning Department
Other Public Officials/Staff	
Gary G. Fink	Chief, Personnel Branch, Western Program Services Bureau, SSA
Al Jones	Richmond Redevelopment Agency

Other Public Officials/Staff (Continued)	
Mr. Kirby	General Services Administration
Ed McKeegan	Former Mayor, City Councilman
Gerald Rasmussan	Planning Department
Mr. Narlaez	Building Department
Nathaniel Bates	Former Mayor, Councilman
Bankers	
Kenneth Berndt	Central Bank
Businessmen	
James McMillian	Pharmacist
William Evans	Management Services Corporation
Larry Rich	Standard Oil of California
Community Organizers	
B.T. Anderson	Jones Memorial Methodist Church
Developers	
Paul Peterson	Developer, White Cliff Village View Apartments
Ken Hooper	Whitecliff Homes
Realtors	
John Marziano	Manager, Pacific Bay Real Estate
Charles Harris	Real estate broker
Ed McKeegan	Real estate broker (retired)
Charles Harris	Real estate broker
Retailers	
Clarke Stone	Macy's

ROCKRIDGE

Category/Name	Title/Organization
Other Public Officials/Staff	
Chet Martin	Deputy Assessor, Alameda County
Bankers	
Sharon McPherson	Manager, Bank of America
Realtors	
Brenda Hunt	Realtor, J.T. Ward Realty
Other Real Estate	
Dene Ogden	Appraiser

WALNUT CREEK

Category/Name	Title/Organization
Agency Directors	
Gary Binger	Director, Walnut Creek Planning Department
Other Public Officials/Staff	
Harley Goldstrum	Planning Department
Les Foley	Planning Department
Businesspeople	
Gary Ward	Safeway Administrative Offices
Jay P. deLeau	Walnut Creek Chamber of Commerce
Design Professionals	
Harmut Gerdes	Diablo Keys Designer
Developers	
Mr. Pardini	Perma Built Homes
Hal Thomas	Systech Corporation
Norm Meltzer	Interland
Carlos Zocchi	Zocchi Building Contractors
Real Estate	
Bob Stevens	Bob Stevens, Inc.
John Grobe	John Grobe & Company
Other Real Estate	
Edna Beason	Manager, Greenwood Apartments
Mr. Bettencourt	Manager, Stoneridge Apartments
Verda Luthey	Manager, Diablo Keys Apartments
Retailers	
Robert Mann	Cost Plus
Dick Draft	Bullock's

FREMONT

Category/Name	Title/Organization
Agency Directors	
Herbert Epstein	Director, Fremont Economic Development Dept.
Other Public Officials/Staff	
Robert Shanks	Associate Planner, Fremont Planning Dept.
Bruce Dotson	Planning Department

Businesspeople	
J. Altar	Independent insurance broker
Developers	
Art Nattingham	Gentry Homes
Steve Schott	Citation Homes
Bill Watson	Presley Company
Donna Schoessow	McKeon Construction
Dick Randall	Williams Lyon Company
Dudley Frost	Morrison Homes
Jim Gilmetti	Shappel Industries
L.B. Nelson	L.B. Nelson Company
William Schorer	Great American Land Company
Realtors	
Dan Clap	Century 21 Realty
Other Real Estate	
Arnold Anderson	Appraiser; former member, BART Board of Directors
Chuck Beebe	Manager, El Pomar Trace Apartments
Jerry Brownlow	Manager, Laurel Manor
Retailers	
Bud Young	Montgomery Ward & Company